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by Alton Y. Roppel, Ancel M. Johnson, Richard D. Bauer, Douglas G. Chapman, and Ford Wilke

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by

Alton Y. Roppel, Ancel M. Johnson, Richard D. Bauer,
Douglas G. Chapman, and Ford Wilke

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ABSTRACT

From 2 July to 5 August and during various periods from 13 August to 19 September when female seals were killed, 43,203 male seals were taken on St. Paul Island and 10,477 on St. George Island. The peak of the kill occurred from 22 to 26 July. Age classification in percent was: St. Paul, age 2-4, age 3-61, age 4-33, age 5-2; St. George, age 2-6, age 2-56, age 4-36, age 5-2. The kill was 15 to 20 percent less than predicted for 1962. The forecast for 1963 is 59,000 males if the kill is terminated 31 July and 72,000 if terminated 15 August. The pup population on the Pribilof Islands for 1959 was estimated to be 838,000. Tag ratios from fall sampling of pups produced a low estimate for 1962 (382,000). Harem and idle bulls counted were 12,674 and 11,750, respectively. A total of 43,760 females were removed from the herd. Fifty-five percent of the females taken in August were ages 3-5; in September these ages made up 24 percent. The percent of post partum females increased when animals were taken on rookeries and when the proportion of older animals increased. A total of 3,718 tagged seals, including 2,417 with checkmarks only and 20 tagged on Soviet islands, were recovered. Fifty thousand seal pups and 839 yearlings were tagged. Land pup mortality was 53,748. Untagged pups were heavier than tagged pups from early September to late October. Weights were significantly different in early September only. Pups gained 3.5-4.0 kilograms from early September to late October. Seal pups are infected with the intestinal phase of hookworm by ingesting the parasite with milk. Seals of all ages harbor a tissue phase of hookworm in their belly blubber.

INTRODUCTION

Beginning in 1956 the Pribilof seal herd has been subjected to a program designed to reduce the number of pups produced annually with the expectation that as the number was reduced the rate of survival would improve.

During the 7-year period, over 225,000 female seals have been taken on the Pribilof Islands. Natural mortality, which was increased in intensity in some of these years, also reduced the number of females an additional indefinite amount. The combined effect of these reductions appears to show: in abandoned rookery areas, in greater difficulty in finding off-rookery groups of females, and in the need for more effort to tag a specified number of pups. These changes are somewhat subjective and not readily measurable.

Estimates of the number of pups produced, based on tag recoveries at ages 3 and 4 years for seals born up to 1959, do not suggest that up to that year a substantially reduced number of pups were being produced.

Note.--Alton Y. Roppel, Ancel M. Johnson, Richard D. Bauer, and Ford Wilke, *Wildlife Biologists*, Bureau of Commercial Fisheries, Marine Mammal Biological Laboratory, U.S. Fish and Wildlife Service, Seattle, Washington; and Douglas G. Chapman, Laboratory of Statistical Research, University of Washington, Seattle, Washington.

The 3-year difference between the appearance of a new year class of pups and the estimate of its size, in addition to inflationary errors in the estimate, tends to make it difficult to understand the current situation.

An accurate estimate of the number of pups now being produced is an essential starting point for adjustments in management measures. The adjustments would lead to a closer approach to the point of maximum sustained yield and to efficient use of surplus females.

To obtain more accurate and more current estimates of production, experiments are being carried on (1) to use a mark ratio to estimate the number of pups during their first year and (2) to determine sources of bias in estimates from tags and to measure their effect.

The life history of the hookworm infecting fur seals as brought out by recent research illustrates again the futility of more than experimental management without some understanding of the biology of the species being managed. The investigation of hookworm infection is a beginning in a study that should identify the causes of fur seal mortality, their relative importance, how they operate, their interrelationships, and how they are influenced by population size.

When a start has been made in assembling this kind of knowledge, forecasts of year-class success can be based on more definite relationships than those that now must be used.

The 1962 field season on the Pribilof Islands extended from May to November. Arrivals, departures, and affiliations of research workers were as follows:

Name	Arrival and Departure	Affiliation	Work
William J. L. Sladen	23 April to 4 June	Johns Hopkins University	Upper respiratory infections in humans
Richard S. Peterson	15 May to November	Bureau of Commercial Fisheries and Johns Hopkins University	Behavior of fur seals
Eugene T. Lyons	20 May to 10 September	Colorado State University	Hookworm infection of fur seals
David Hopkins	18 June to 20 July	U.S. Geological Survey	Geology of Pribilof Islands
Allen Cox	" "	"	"
Edward Roth	" "	"	"
Peter A. Dzikiewicz[1]	20 June to 10 September	Bureau of Commercial Fisheries	Fur seal research, general
Robert L. DeLong[1]	" "	"	"
Robert L. Rost[1]	" "	"	"
C. John Ralph[1]	27 June to September	"	"

See footnote at end of listing.

Name	Arrival and Departure	Affiliation	Work
Alton Y. Roppel	27 June to 4 September	Bureau of Commercial Fisheries	Fur seal research, general
O. W. Olsen	2 July to 30 July	Colorado State University	Hookworm infection of fur seals
Kenneth E. Thompson [1]	7 July to 17 September	Bureau of Commercial Fisheries	Fur seal research, general
Richard K. Stroud [1]	7 July to 10 September	"	"
William G. Reeder	9 July to 20 July	University of Wisconsin	Mother-young communication in seals
James Nybakken	" "	"	"
Ancel M. Johnson	15 August to 17 September	Bureau of Commercial Fisheries	Population dynamics of fur seals
Mark C. Keyes	15 August to 10 September	"	Mortality of fur seals
Ford Wilke	15 August to 17 September	"	Fur seal research, general
Richard D. Bauer	15 August to 15 October	"	"

[1] Temporary employee.

Koji Nakamura spent the period from 23 July to 16 August on the Pribilof Islands observing fur seal research and management. Nakamura represents the Government of Japan in the First Ocean Section, Production Division, Fisheries Agency. He visited the Marine Mammal Biological Laboratory in Seattle on 17 August.

Warren Garst, a graduate student at Colorado State University and professional wildlife photographer, made a film of wildlife on St. Paul Island for Don Meier Television Productions from 11 June to 23 July.

POPULATION

MALES

Age Classification

Age classification of the male kill was determined from a sample of 5,242 canine teeth collected on St. Paul Island and from 1,290 collected on St. George Island. Sampling was carried on throughout the male kill from 2 July to 5 August and from 13 to 18 and 20 to 24 August when an attempt was made to take 4-year-old males during the female kill. In 1962, length limits for taking males were 106.6 to 123.8 centimeters (42 to 48 3/4 inches), measured from tip of nose to tip of tail. These limits correspond essentially to the 1961 limits of 104.1 to 121.2 centimeters (42 to 47 3/4 inches) as measured from tip of nose to base of tail.

The daily and cumulative age classifications of the male kill are given in appendix tables 7 and 8 for St. Paul Island and in 9 and 10 for St. George Island. Age classification of the male kill on Tolstoi and Lukanin-Kitovi is separated in appendix table 11. The peak of the kill occurred during round 6 (22-26 July) when 8,577 males were taken on St. Paul

Island. The pattern of the 1962 kill followed that of years before 1960 and 1961. In 1960 and 1961, 83 and 72 percent of the kill on St. Paul Island was comprised of 3-year-old seals. This followed the general rule that kills which draw on a relatively strong 3-year-old class and are continued to 10 August or later will have a peak later than round 6 (22-26 July).

Several occurrences during the 1962 male kill pointed to the influence of weather on the seals in their choice of when and where to haul out. For example, the number (4,347) of males killed during round 7 (27-31 July) seemed abruptly low compared to the kill of 8,577 in round 6, although the latter was assumed to be the peak at the time. Therefore, part of the reduction was tentatively attributed to an unusually severe and prolonged summer storm which lasted from 27 July through 5 August. This assumption was proved correct when the Tolstoi-Zapadni hauling grounds, which were fully exposed to the storm's force, produced 3,238 males in round 8 (1-5 August) as compared to only 1,262 animals during round 7 (27-31 July). A total of 3,656 males were taken from the Tolstoi-Zapadni hauling grounds during the most productive round, round 6 (22-26 July).

Additional evidence of the storm's influence was shown by the fact that 2,667 of 3,238 males taken from the Tolstoi-Zapadni hauling grounds in round 8 were found on a protected beach near Tolstoi Rookery.

During rounds 2 through 7, an average of 69 percent (range 43-90 percent) of the returning 3-year-old seals tagged as pups on the Zapadni Rookeries in 1959 were recovered on the Zapadni hauling grounds. In round 8, during the storm, the homing tendency of 3-year-old seals tagged on the Zapadni Rookeries was reduced to 26 percent, a figure 43 percent below the average of preceding rounds. Many of them were taken near Tolstoi Rookery.

The male kill ended 5 August with a total take on the Pribilof Islands of 49,039. Attempts to take 4-year-old males during the 10-day female kill beginning 13 August added only 837 of this age class to the total, suggesting that most males from the 1958 year class had been killed. An additional 3,598 males, made up of 1,303, 2,144, and 151 2-, 3-, and 5-year-old seals, respectively, were taken during the female kill ending 24 August. In September 206 unclassified males were killed. Table 1 shows the kill of male seals, by year class, for the years 1947 through 1960. Tables 2 and 3 illustrate the male kill at various dates for 1954-62 and cumulative number of males killed from 1955 to 1962, St. Paul Island. The percent cumulative male kill, by round, age, and island is shown in figure 1.

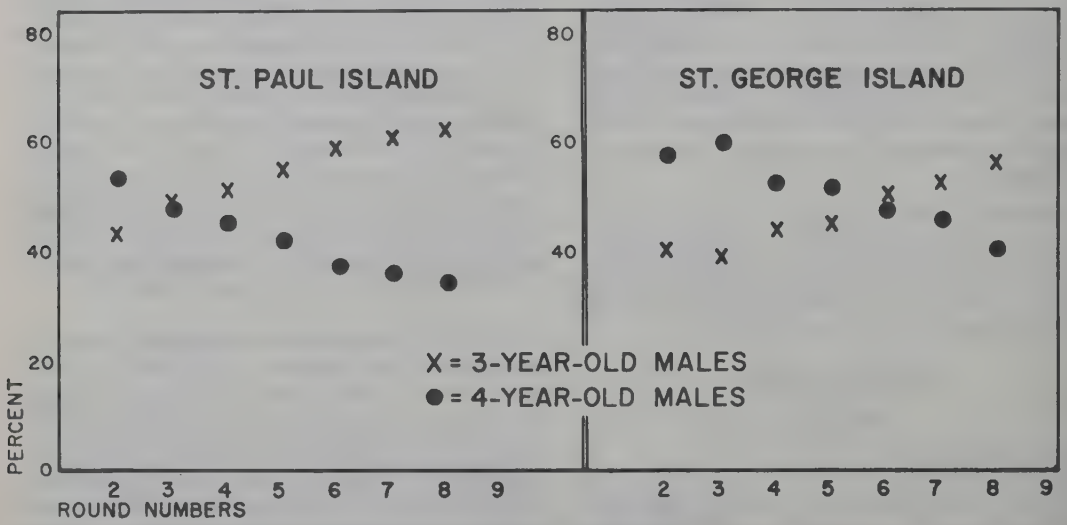


Figure 1.--Percent 3- and 4-year-old male seals in cumulative kill, by island and round, Pribilof Islands, Alaska, 1962.

TABLE 1.--Kill of male seals, by year class, Pribilof Islands, Alaska 1947-60

Year	St. Paul Island				Total	St. George Island				Total	Grand total[1]
	Age when killed					Age when killed					
	2	3	4	5		2	3	4	5		
1947	--	30,110	23,697	854	54,661	--	7,043	3,731	123	10,897	65,558
1948	486	25,714	19,995	103	46,298	114	5,546	3,926	22	9,608	55,906
1949	--	29,697	12,326	249	42,272	303	7,116	2,570	280	10,269	52,541
1950	855	40,656	15,365	332	57,208	1,104	8,475	4,793	147	14,519	71,727
1951	1,384	32,350	18,083	3,057	54,874	288	7,907	5,310	681	14,186	69,060
1952	1,735	30,733	31,410	675	64,553	545	8,998	8,459	506	18,508	83,061
1953	839	38,312	8,855	54	48,060	295	10,611	3,330	100	14,336	62,396
1954	2,918	23,473	5,599	554	32,544	535	6,651	2,779	162	10,127	42,671
1955	1,015	27,863	10,555	115	39,548	555	7,246	2,825	260	10,886	50,434
1956	885	10,671	2,762	532	14,850	171	2,251	1,387	218	4,027	18,877
1957	2,590	24,283	15,344	773	42,990	242	5,098	4,492	244	10,076	53,066
1958[2]	1,977	48,458	14,149	--	64,584	431	9,413	3,707	--	13,551	78,135
1959[2]	2,820	26,456	--	--	29,276	891	5,890	--	--	6,781	36,057
1960[2]	1,619	--	--	--	1,619	636	--	--	--	636	2,255

[1] Does not include Pribilof seals taken at sea or on Asian islands, nor 4,682 not classified as to age.
[2] Incomplete returns.

TABLE 2.--Male kill at various dates, by age, St. Paul Island, 1954-62

Date	Kill level	Age in years	
		3	4
		Percent	*Percent*
1954: 4 July	10,000	44	54
11 "	20,000	49	49
18 "	30,000	56	41
27 "	49,699	65	31
1955: 9 July	10,000	50	48
16 "	20,000	53	46
22 "	30,000	56	42
31 "	49,977	62	36
1956: 6 July	10,000	24	64
11 "	20,000	30	62
16 "	30,000	33	60
26 "	50,000	41	52
15 August	75,736	51	42
1957: 13 July	10,000	53	41
24 "	20,000	63	33
5 August	30,000	67	28
10 "	34,055	69	26
1958: 10 July	10,000	74	26
18 "	20,000	78	22
28 "	30,000	80	19
31 "	33,325	82	17
1959: 14 July	10,000	38	57
27 "	20,000	45	50
31 "	22,286	46	47
1960: 21 July	10,000	80	17
1 August	20,000	83	12
7 "	28,819	84	10
1961: 9 July	10,000	61	37
18 "	20,000	62	37
24 "	30,000	66	32
2 August	50,000	70	27
15 "	67,169	72	23
1962: 12 July	10,000	49	47
20 "	20,000	54	42
26 "	30,000	59	37
5 August	39,983	62	34

TABLE 3.--Cumulative number of male seals killed, St. Paul Island, 1955-62[1]

Date		Age in years		Date		Age in years	
		3	4			3	4
1955:	1 July	1,574	1,962	1959:	1 July	584	1,474
	6 "	3,341	3,643		6 "	1,364	3,028
	11 "	5,929	6,248		11 "	2,625	4,665
	16 "	10,416	8,999		16 "	4,189	6,425
	21 "	15,358	11,648		21 "	6,096	7,949
	26 "	21,707	15,638		26 "	8,327	9,721
	31 "	30,733	18,083		31 "	10,203	10,446
1956:	1 July	1,079	3,056	1960:	1 July	699	368
	6 "	2,671	7,060		6 "	1,751	676
	11 "	6,145	12,677		11 "	3,274	988
	16 "	9,808	17,954		16 "	5,529	1,385
	21 "	14,589	22,159		21 "	7,904	1,717
	26 "	20,726	25,999		26 "	10,978	1,968
	31 "	26,590	28,560		31 "	15,312	2,347
	5 Aug.	31,701	29,853		5 Aug.	21,610	2,657
	10 "	35,502	30,663		10 "	24,201	2,757
	15 "	38,290	31,448				
1957:	1 July	1,360	1,071	1961:	6 July	4,119	2,315
	6 "	2,994	2,161		11 "	6,770	4,316
	11 "	4,507	3,296		16 "	9,993	6,021
	16 "	6,777	4,651		21 "	15,492	8,302
	21 "	9,380	5,602		26 "	22,609	10,851
	26 "	13,350	6,784		31 "	29,523	12,488
	31 "	16,804	7,547		5 Aug.	38,908	14,072
	5 Aug.	19,823	8,196		10 "	43,629	14,780
	10 "	23,473	8,855		15 "	48,458	15,344
1958:	1 July	1,991	732	1962:	6 July	1,639	2,028
	6 "	3,988	1,383		11 "	4,485	4,335
	11 "	8,038	2,658		16 "	7,643	6,636
	16 "	12,917	3,912		21 "	11,226	8,663
	21 "	17,688	4,839		26 "	17,301	10,832
	26 "	22,661	5,279		31 "	20,267	12,047
	31 "	27,216	5,556		5 Aug.	25,098	13,422

[1] Sealing began 2 July in 1961 and 1962, 27 June all other years.

1955	Male kill ended	31	July	1959	Male kill ended	31	July
1956	" " "	15	August	1960	" " "	7	August
1957	" " "	10	"	1961	" " "	15	"
1958	" " "	31	July	1962	" " "	5	"

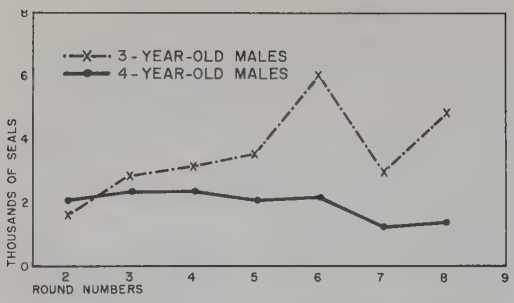


Figure 2.--Kill of male seals, by age and round, St. Paul Island, 1962.

Figure 2 shows the number of male seals killed, by age and round, on St. Paul Island.

In 1960 and 1961 the kill of 3-year-old males was increased about 12 and 25 percent, respectively, from 6 to 15 August. Similar increases in 1962 would have provided 3,000 to 6,000 additional animals. Field observations, which are subjective in nature, suggest that a larger number of 3-year-old males could have been taken after 5 August. During the first 3 days of the female kill beginning 13 August, 1,041 3-year-old males were taken unintentionally. Assuming that the field observations are correct in suggesting that at least the same proportion of increase in the male kill was possible for the period 1-15 August 1962 as in 1961, the estimate obtained is given in table 4.

The total of all ages shown in table 4, 60,674, is about 16 percent less than the 72,500 predicted. Table 5 compares the predicted and actual kill of male seals in 1962.

Bull Counts

The 1962 bull counts are given in table 6 by island and by rookery. All bull counts since 1910 are presented in appendix table 30.

Harem bulls on St. Paul Island decreased by 7.4 percent of the 1961 count; those on St. George Island decreased 17.5 percent. The total number of harem bulls on the Pribilof Islands was 90.5 percent of the 1961 count, bringing the 1962 level down to that of 1960.

Idle bulls decreased by 17.6 percent of the 1961 count; St. Paul Island showed a decrease

Table 4.--Estimated increase in kill by extrapolation to 15 August, Pribilof Islands, Alaska, 1962

	Age in years			
	2	3	4	5
Kill on St. Paul Island	1,619	26,456	14,149	773
Probable increase if kill extended to 15 August less accidental kill	1,000	5,000	--	--
Kill on St. George Island	636	5,890	3,707	244
Probable increase if kill extended to 15 August (20 percent of increase on St. Paul Island)	200	1,000	--	--
Total	3,455	38,346	17,856	1,017

TABLE 5.--Predicted and actual kill of male seals, Pribilof Islands, Alaska, 1962

Age	Predicted kill to 15 August			Actual kill to 5 August
	St. Paul	St. George	Total	
Years				
3	44,000	11,000	55,000	30,202
4	11,000	2,750	13,750	17,019
Other	3,000	750	3,750	1,818
Total	58,000	14,500	72,500	49,039

of 22.7 percent, while the number on St. George Island increased 6.5 percent.

Because bull counts are made but once annually on the Pribilof Islands, substantial differences between two successive years do not necessarily reflect an actual change in numbers, except on land. For example, large numbers of idle bulls have been observed to disappear from the hauling grounds and rookery fringes within a relatively short period of time, only to return just as quickly. A behavior study begun in 1961, but not yet completed, relates heavy rainfall and high air temperature to the sudden movement of idle bulls from land to sea. Females are affected similarly. Although the departure and return of the harem bull escapes cursory observation, careful observations made during the present behavior study show that the harem bull of the Pribilof Islands is less of a permanent land resident during the breeding season than formerly reported.

Thus, the newly born pup crop is the only herd element that can be found on land in its entirety, and then only when most of the pups have been born and before they begin to enter the water.

FEMALES

The decision to bring the number of females down to the calculated level of maximum sustained yield has resulted in a total kill of 226,102 females on land during the 7-year period 1956-62. Herd reduction aimed toward preventing the adverse effects of a peak population was in progress only a year before the herd began to display some of these effects. Mortality of pups on land had already been increasing for several years. The most obvious effect has been wide fluctuation in survival of the year classes. Scarcely 18,000 males were killed at ages 2, 3, and 4 from the record 496,000 male pups estimated to have been born in 1956. In contrast, 1958 production of 376,000 male pups contributed a total of 78,000 males to the kill at ages 2, 3, and 4.

That the number of females has been substantially reduced through the combined effects of natural mortality and commercial killing seems apparent from field observations. However, population estimates through the 1959 year class do not indicate that a reduction has been achieved. As recently as 1959, certain of the hauling grounds occupied more surface area than at present. The fewer females on the hauling grounds have allowed vegetation to advance into areas where the activity of many animals formerly kept the ground bare.

An analysis of the relationship of time to the number of females killed supports the general observations. In 1956, 22,680 females were taken on the Pribilof Islands by 15 August. Many additional females, particularly old animals, were spared because the coincidental kill of 95,936 males severely taxed the island

TABLE 6.--Harem and idle bull count, by rookery, Pribilof Islands, Alaska, 1962

Date	Rookery	Bulls		Total
		Harem	Idle	
	St. Paul Island			
10 July	Gorbatch	862	743	1,605
	Ardiguen	131	85	216
	Reef	1,564	1,205	2,769
	Total	2,557	2,033	4,590
11 July	Polovina	273	592	865
	Polovina Cliffs	779	641	1,420
	Little Polovina	326	680	1,006
	Total	1,378	1,913	3,291
12 July	Morjovi	870	1,023	1,893
	Vostochni	1,633	1,255	2,888
	Total	2,503	2,278	4,781
13 July	Tolstoi	1,032	527	1,559
	Lukanin	251	185	436
	Kitovi	579	146	725
	Total	1,862	858	2,720
15 July	Zapadni	1,115	1,502	2,617
	Little Zapadni	639	350	989
	Zapadni Reef	278	175	453
	Total	2,032	2,027	4,059
	St. Paul Island	10,332	9,109	19,441
	St. George Island			
15 July	Staraya Artil	305	432	737
15 July	East Reef	160	330	490
	East Cliffs	319	253	572
	Total	479	583	1,062
16 July	North	973	1,002	1,975
17 July	Zapadni	321	454	775
	South	264	179	443
	Total	585	633	1,218
	St. George Island total	2,342	2,650	4,992
	Pribilof Islands total	12,674	11,759	24,433

skin-curing facilities. The smaller male kill in 1957 allowed a kill of 47,413 females by 20 August. Some of the larger females were allowed to escape. A minimum length of 104.1 centimeters (41 inches) and a maximum kill of 50,000 animals were the only restrictions on the taking of females in 1956 and 1957. Because it was learned that many of the skins from females age 6 and older were of low quality, excessive numbers of large, scarred females were avoided in 1958 by imposing length limits of from 104.1 to 120.6 centimeters (41 to 45 3/4 inches). Within these limits, 31,102 females were taken without difficulty by 20 August. A compromise between the need for obtaining commercially acceptable skins and the need for herd reduction resulted in the 1959 plan to take 50,000 females with as many as possible to be less than 46 inches in length. The actual kill was 28,064 by 20 August, of which 72 percent were less than 46 inches in length. A comparative figure of 58 percent less than 46 inches in length for the reasonably unrestricted 1957 kill suggests that several hundred additional females 46 inches and longer were available through 20 August 1959. Thus, an average of 32,314 females was taken by 20 August in each of the first 4 years despite varying restrictions and conditions that curtailed the kill to some extent.

Partly because of an extremely low male kill and partly because comparative photographs suggested significant decreases since 1949 in occupied rookery areas, a field decision was made in 1960 to limit the female kill of that year to 350 per day for research purposes. The resulting kill of only 4,315 females should have allowed substantial increases in the availability of females in 1961 and 1962. However, this was not the case. Although established quotas of 43,750 females for each of these years were fulfilled, September reduction kills from 9 to 10 days were necessary in addition to the kill ending 15 August in 1961 and 24 August in 1962.

Methods Used in Current Studies

The female kill is sampled similarly to the male kill except that age is correlated with the reproductive condition of each female sampled. As with males, age classification of the sample is projected to the total kill of females to obtain an estimate of the number taken from each age class. With some variation, this procedure was again followed in 1962. On St. Paul Island, 8,161 of 15,639 females killed in September were sampled for age and reproductive condition. The remaining 7,478 females were sampled for age classification only. During the kill ending 24 August, tagged females only were examined for reproductive condition. In addition, the tagged females were weighed and their body lengths recorded.

Occasionally, during the female kill, the females were aligned in rows of 20 animals. The first 10 animals in each row included females with black or mixed color (black and white) vibrissae; the remaining 10 animals were made up of females with white vibrissae. This method was intended to separate young (approximately ages 2 to 5) from older (age 6 and older) females. The animals were sampled as though there were 2 rows of 10 animals each, i.e., animals 1 and 2 and 11 and 12 were sampled in the first row of 20, 2 and 3 and 12 and 13 were sampled in the second row, etc. This method is intended to minimize sampling bias if the workmen selectively position certain sized seals in the row.

A behavior study begun in 1961 was continued in 1962.

Age Classification

The age compositions for the female kills on the Pribilof Islands in 1962 are given in appendix tables 12, 13, 14, and 15. Table 7 gives the year-class contributions to the female kills on the Pribilof Islands.

Table 8 summarizes the age composition of females sampled from the kills of 1958-62. The reduced number of older females in the 1958 and 1959 samples is a result of the maximum length limit imposed on the taking of females in those years. Had there been no length limit, the age composition of females taken in 1958 and 1959 would have been comparable to those of 1960 through 1962. Because the age composition of females sampled from the July-August and September kills of 1961

TABLE 7.--Year class contributions to kill of female seals by age,[1] Pribilof Islands, Alaska, 1939-61

Year class	Age in years									
	1	2	3	4	5	6	7	8	9	10
1939	--	--	--	--	--	--	--	--	--	17
1940	--	--	--	--	--	--	--	--	8	15
1941	--	--	--	--	--	--	--	16	7	15
1942	--	--	--	--	--	--	15	13	7	39
1943	--	--	--	--	--	12	8	10	41	36
1944	--	--	--	--	3	11	9	57	43	10
1945	--	--	--	4	4	8	45	43	11	27
1946	--	--	--	4	4	60	54	11	38	762
1947	--	1	--	1	37	84	46	48	1,136	1,773
1948	--	--	--	84	75	94	77	1,766	3,120	678
1949	--	--	30	34	161	118	2,155	3,550	559	1,173
1950	--	10	17	92	210	2,949	4,031	654	1,289	345
1951	4	--	8	85	4,618	6,343	1,328	1,958	492	2,292
1952	--	--	16	6,422	11,465	3,408	3,515	526	3,127	1,687
1953	--	1	2,132	5,806	4,056	2,958	493	2,843	2,247	
1954	--	132	1,150	8,493	3,771	683	3,057	2,809		
1955	--	11	11,468	7,285	1,047	4,810	2,869			
1956	--	601	2,072	614	4,520	3,444				
1957	150	281	352	6,912	6,303					
1958	76	79	4,651	8,683						
1959	27	508	4,563							
1960	120	431								
1961	37									

[1] Includes pelagic kill of United States and Canada, 1958-62. In addition to above, 49,532 females, age 10+, and 217 females, unclassified, were taken.

TABLE 8.--Percent age composition of female seals sampled from the kills, Pribilof Islands, Alaska, 1958-62

Year and island	Age in years									
	2	3	4	5	6	7	8	9	10	10+
1958										
St. Paul	2	37	29	13	11	3	1	1	2	1
St. George	1	20	22	17	13	9	4	3	2	9
1959										
St. Paul	1	6	25	14	11	12	6	4	4	17
St. George	-	6	20	14	10	13	7	6	5	19
1960										
St. Paul	1	8	14	23	14	9	8	7	4	12
St. George	-	3	9	20	12	8	10	9	5	24
1961										
St. Paul	1	10	16	10	11	6	6	7	5	28
St. George	1	11	15	10	10	7	6	7	6	27
1962										
St. Paul										
July-August	1	14	26	15	6	5	4	3	3	23
September	-	2	9	13	10	9	10	8	4	35
St. George	1	12	24	14	8	5	5	3	3	25

were essentially alike, the two sets of data were combined. In 1962, however, selective killing on St. Paul Island for young females during the July-August kill and for old females during the September kill produced differences in age composition, making it necessary to list the samples separately. There was no September kill on St. George Island in 1962 because the female quota was taken in August.

Reproduction

Gross reproductive condition was determined for a sample of 562 tagged and 917 untagged females on St. Paul Island and for 200 tagged females on St. George Island. Summaries of the reproductive condition of these females are given in tables 9, 10, and 11. Figure 3 show the reproductive condition of tagged seals, by age class, sampled from the August kill. Figure 4 shows the reproductive condition of female seals, by date and age, sampled from the September kill. The progressive increase in percent post partum females, for each age class, is attributed to a

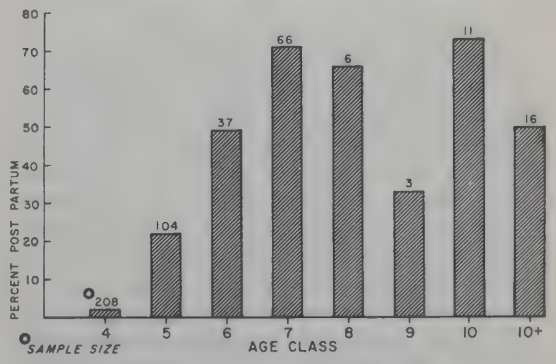


Figure 3.--Percent postpartum tagged female seals sampled from the kill, by age, St. Paul Island, 13-17 and 20-24 August 1962.

TABLE 9.--Summary of reproductive condition of tagged female seals sampled from the kill, St. Paul Island, 13-17 and 20-24 August 1962

Reproductive condition	Age in years										
	2	3	4	5	6	7	8	9	10	10+	Total
Post partum:											
Primiparous:											
number	-	-	5	23	8	14	-	-	-	-	50
percent	-	-	2	23	22	21	-	-	-	-	9
Multiparous:											
number	-	-	-	-	10	33	4	1	8	8	64
percent	-	-	-	-	27	50	66	34	27	50	11
Total post partum:											
number	-	-	5	23	18	47	4	1	8	8	114
percent	-	-	2	23	49	71	66	34	27	50	20
Nonpregnant:											
Nulliparous:											
number	13	100	202	77	13	2	-	-	-	-	407
percent	100	100	97	75	35	3	-	-	-	-	73
Primiparous:											
number	-	-	1	2	3	5	1	-	-	-	12
percent	-	-	1	2	8	8	17	-	-	-	2
Multiparous:											
number	-	-	-	-	3	12	1	2	3	8	29
percent	-	-	-	-	8	18	17	66	27	50	5
Total nonpregnant:											
number	13	100	203	79	19	19	2	2	3	8	448
percent	100	100	98	77	51	29	34	66	27	50	80
Grand total	13	100	208	102	37	66	6	3	11	16	562
Percent	2	18	37	18	6	12	1	1	2	3	

Sample size in percent of kill: 3.2
Sample size in percent of total tagged females killed: 84.3

gradual shift from killing females from the hauling grounds to killing those taken from rookery fringes or from rookeries.

The annual variations in pregnancy rates, by age and island, are given in table 12 for 1956-62. There have been no changes in pregnancy rates that can be attributed to the effect of herd reduction. Variations by age observed are the result of the locations where the females were obtained rather than of population manipulation. As previously stated, females taken from rookeries or from the rookery fringe areas exhibit pregnancy rates much in excess of those taken from the hauling grounds. While it is known that many rookery females infiltrate the hauling grounds and are included in the kill, it is not possible to identify a mixture that is representative of the herd as a whole.

Appendix tables 16, 17, and 18 show the reproductive condition, by day and island, of females sampled in 1962. Appendix tables 19 and 20 show the reproductive condition of female seals 4 or more years old and 5 or more years old sampled from the kill.

TAG RECOVERIES AND TAGGING

Tag Recoveries

A summary of tags and checkmarks recovered from the kill in 1962 is given in table 13 by sex, age, and island. Tagged male seals were killed only if they were within the length limits prescribed for taking males, or 106.6 to 123.8 centimeters (42 to 48 3/4 inches), tip of nose to tip of tail. Only the minimum length restriction of 106.6 centimeters (42 inches) applied to the taking of

TABLE 10.--Summary of reproductive condition of tagged female seals sampled from the kill, St. George Island, 3, 5, 13-17, and 20-23 August 1962

Reproductive condition	Age in years										Total
	2	3	4	5	6	7	8	9	10	10+	
Post partum:											
Primiparous:											
number	-	-	2	14	7	-	-	-	-	-	23
percent	-	-	2	28	47	-	-	-	-	-	12
Multiparous:											
number	-	-	-	1	1	1	-	-	-	-	3
percent	-	-	-	2	6	100	-	-	-	-	1
Total post partum:											
number	-	-	2	15	8	1	-	-	-	-	26
percent	-	-	2	30	53	100	-	-	-	-	13
Nonpregnant:											
Nulliparous:											
number	12	37	83	35	6	-	-	-	-	-	173
percent	100	100	98	70	41	-	-	-	-	-	86
Primiparous:											
number	-	-	-	-	-	-	-	-	-	-	-
percent	-	-	-	-	-	-	-	-	-	-	-
Multiparous:											
number	-	-	-	-	1	-	-	-	-	-	1
percent	-	-	-	-	6	-	-	-	-	-	1
Total nonpregnant:											
number	12	37	83	35	7	-	-	-	-	-	174
percent	100	100	98	70	47	-	-	-	-	-	87
Grand total	12	37	85	50	15	1	-	-	-	-	200
Percent	6	18	42	25	8	1	-	-	-	-	

Sample size in percent of kill: 2.5
Sample size in percent of total tagged females: 100.0

females in 1962. A total of 3,718 tags were recovered; 2,417 checkmarks from animals that had lost their tags were recorded. Appendix tables 21 and 22 provide additional details on tag recoveries.

Six females and fourteen males tagged on the western Pacific breeding grounds were recovered on the Pribilof Islands in 1962 (table 14).

Tagging--Pups

Fifty thousand tags of the O-series were attached to pups in 1962. Of these, 40,000 were used on St. Paul Island and 10,000 on St. George Island. Tags were allotted to each rookery according to the proportion of harem bulls counted on that rookery. The rookeries and number of pups tagged on each are listed in table 15. A record of pups tagged on the Pribilof Islands since 1940 is given in appendix table 29.

Tagging was completed in 6.5 days during the period 27 August to 5 September on St. Paul Island and in 2 days on St. George Island, 27-28 August. All tags used in 1962 conformed to the specifications outlined in the 1960[1] report of field activities. Each tag was attached to the rear edge of the right fore

[1] Carl E. Abegglen, Alton Y. Roppel and Ford Wilke. 1960. Alaska Fur Seal Investigations, Pribilof Islands, Alaska. Report of field activities, June-October 1960, Bureau of Commercial Fisheries, Marine Mammal Biological Laboratory, U.S. Fish and Wildlife Service, Seattle Wash. [Processed].

TABLE 11.--Summary of reproductive condition of female seals sampled from the kill, St. Paul Island, 6, 7, and 11-14 September 1962

Reproductive condition	Age in years										Total
	2	3	4	5	6	7	8	9	10	10+	
Post partum:											
Primiparous:											
number	-	-	6	50	38	17	11	8	2	10	142
percent	-	-	6	35	42	18	17	11	5	4	15
Multiparous:											
number	-	-	-	6	22	53	42	48	22	173	366
percent	-	-	-	4	24	57	64	67	58	61	40
Total post partum:											
number	-	-	6	56	60	70	53	56	24	183	508
percent	-	-	6	39	66	75	81	78	63	65	55
Nonpregnant:											
Nulliparous:											
number	6	22	98	81	25	8	3	4	2	6	255
percent	100	100	93	57	28	9	4	5	5	2	28
Primiparous:											
number	-	-	-	4	3	6	-	1	2	2	18
percent	-	-	-	3	3	6	-	2	5	1	2
Multiparous:											
number	-	-	1	2	2	9	10	11	10	91	136
percent	-	-	1	1	3	10	15	15	27	32	15
Total nonpregnant:											
number	6	22	99	87	30	23	13	16	14	99	409
percent	100	100	94	61	34	25	19	22	37	35	45
Grand total	6	22	105	143	90	93	66	72	38	282	917
Percent	1	2	11	16	10	10	7	8	4	31	

Sample size in percent of kill: 12

flipper where furred skin ends and bare skin begins. The checkmark used in 1962 consisted of a "V" notch cut into the front edge of the right fore flipper near the tip. Tag and checkmark locations of fur seal pups tagged since 1946 are shown in figure 5.

Tagging--Yearlings

Seal mortality from birth to age 3 is calculated by subtracting the number killed on land at ages 2 and 3 from the estimated number of pups born. It has been estimated that mortality from birth to age 1 could be separated from mortality from birth to age 3 if 5,000 yearling seals could be tagged. This assumes that most mortality occurs during the first year of life. Continuing heavy mortality beyond age 1 would prevent a satisfactory estimate from 5,000 tagged yearlings.

Trial tagging of yearling seals began in 1961[2] on St. Paul Island. Body weight and, to some extent, pelage characteristics were used to separate yearlings from seals of other ages. Of 740 selected yearlings double tagged in 1961 within the series M-1 to M-2,000, 139 were males and 601 were females. Ten males and four females tagged as pups in 1960 were each given an additional tag.

[2] R.S. Peterson, 1961. Report and analysis of yearling recoveries and tagging, St. Paul Island, 1961. Bureau of Commercial Fisheries, Marine Mammal Biological Laboratory, U.S. Fish and Wildlife Service, Seattle, Wash. [Typed manuscript.]

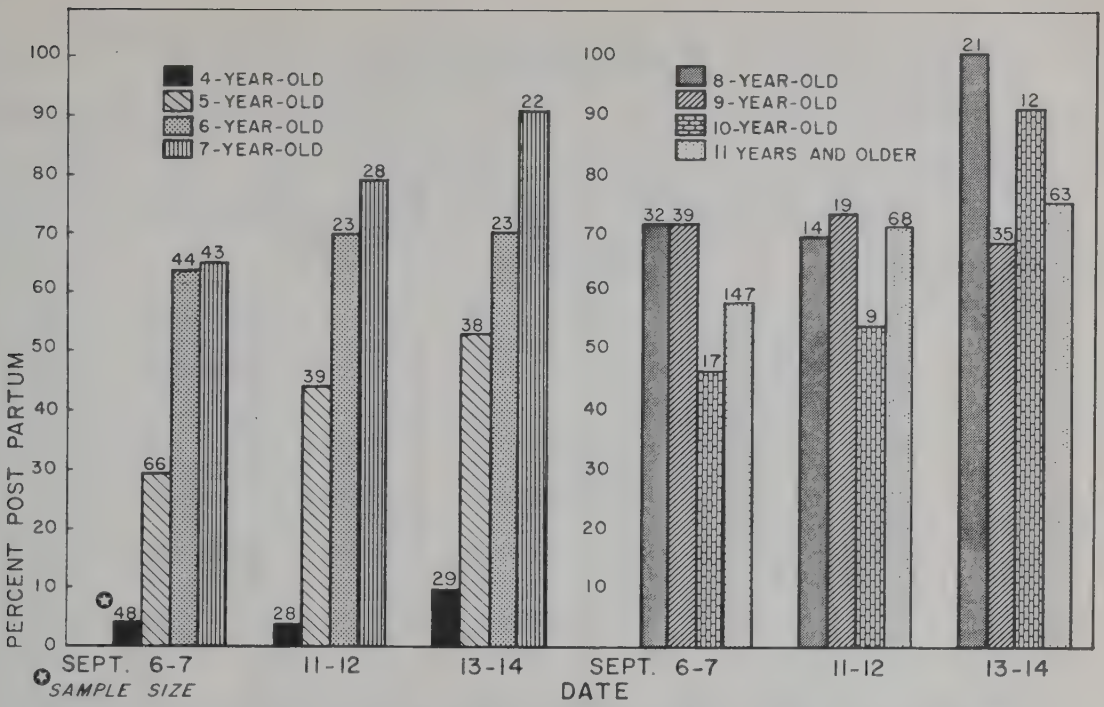


Figure 4.--Percent postpartum female seals sampled from the kill, by date and age, St. Paul Island, 6, 7, and 11-14 September 1962.

In 1941, Wilke and Banner[3] recovered and collected information on 41 yearling males and 6 yearling females tagged as pups in 1940.

Twenty-three animals selected and tagged as yearlings in 1961 were recovered from the kill in 1962 (table 16), but age determination from the canine teeth revealed that only one of these was a yearling when tagged. Thus, body weight is apparently unreliable as an indicator of age. However, the extent cannot be measured until additional animals selected and tagged as yearlings in 1961 are recovered in 1963; seals that actually were yearlings in 1961 would normally be expected to return in greater numbers at age 3 than at age 2. Body length was used as the primary criterion for selection of yearlings in 1962.

[3] Ford Wilke and A. Henry Banner. 1941. Recovery of branded yearlings. Bureau of Commercial Fisheries, Marine Mammal Biological Laboratory, U.S. Fish and Wildlife Service, Seattle, Wash. [Typed manuscript.]

Preliminary surveys made 20 and 24 September on Polovina, Tolstoi, and Little Zapadni Rookeries indicated that sufficient yearlings were present to begin tagging. Six yearlings tagged as pups in 1961 were measured, sexed, and released during the surveys which totaled 3 hours in duration.

During 7.5 days from 26 September to 11 October, 839 animals were double tagged on St. Paul Island within the series N-50,001 to N-51,000, and 128 seals tagged as pups in 1961 were each given an additional tag.

Methods.--A five-man crew surrounded all seals on a certain section of the rookery or hauling ground (the only hauling grounds on which known-age and selected yearlings were found were Polovina Sands and Tolstoi Sands), preventing their escape. A few seals at a time were then allowed to proceed slowly toward the sea so animals tentatively selected as yearlings could easily be extracted from the

TABLE 12.--Annual variation in pregnancy rates of females sampled from the kills, Pribilof Islands, Alaska, 1956-62

Island and year	Age in years							
	4	5	6	7	8	9	10	10+
	Percent pregnant							
St. Paul Island:								
1956	10	57	74	76	61	63	51	36
1957	13	53	78	81	75	73	74	51
1958	6	48	65	72	65	68	61	35
1959	15	59	61	57	54	43	48	39
1960	12	56	72	66	57	66	51	49
1961	3	42	64	67	59	58	58	41
1962[1]	3	32	61	73	79	76	65	64
St. George Island:								
1956	12	52	81	83	72	64	69	53
1957	5	36	58	64	62	57	46	51
1958	10	43	61	56	65	60	64	45
1959	22	62	66	69	75	61	60	51
1960	15	56	59	52	59	51	67	45
1961	2	38	66	64	61	59	59	48
1962[2]	2	15	8	1	-	-	-	-

[1] Tagged and untagged females have been combined.
[2] Tagged females only were examined.

group, either by means of a noose attached to an 8-foot pole, or a lasso. Selected seals were dragged to a tagging site, preferably a level area. After removal of the noose or lasso, the animals were restrained in a straight, flat position so their body lengths could be measured (fig. 6). Tags were attached to the front flippers (fig. 7) of females 95 centimeters or less in length and to males 100 centimeters or less in length.

Maximum acceptable length limits for tagging yearlings were derived from information obtained from measurements of known-age yearlings taken in 1941 and in 1961. Visual selection of "yearlings" in 1962 was based primarily on body size and pelage coloration.

Results.--The number of selected yearlings tagged in 1962 is given, by rookery, in table 17. Sex ratios among selected and known-age yearlings for 1941,[4] 1961,[5] and 1962 are given in table 18. The discrepancy in sex ratios between known-age and selected yearlings for 1961 is discussed later.

Distribution of body lengths for selected and known-age yearlings is given in figures 8 and 9. Mean body lengths of selected yearlings were 93.6 centimeters for males and 91.5 centimeters for females, and those of known-age yearlings, 94.6 and 90.3 centimeters, males and females, respectively. Mean lengths of 12 male yearlings recovered in 1941 were 95.4 centimeters and of 6 female yearlings, 87.1 centimeters. In 1961, the mean length of five known-age male yearlings was 88.6 centimeters. As shown in figure 9, lengths of known-age female yearlings did not exceed

[4] See footnote 2, page 16.
[5] See footnote 3, page 17.

TABLE 13.--Summary of tagged and tag-lost seals recovered from the kills, Pribilof Islands, Alaska, July-August and September 1962

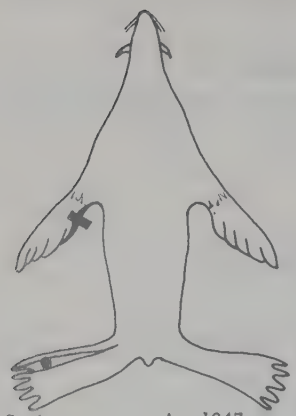
Series	Age	Tagged seals			Tag-lost seals			Grand total
		St. Paul Island	St. George Island	Combined total	St. Paul Island	St. George Island	Combined total	
	Years							
				July-August				
				Male				
N	1	1	-	1	-	-	-	1
M	2	146	53	199	72	20	92	291
L	3	1,128	200	1,328	665	107	772	2,100
K	4	794	141	935	419	66	485	1,420
J	5	40	16	56	155	22	177	233
I	6	2	-	2	-	-	-	2
Total		2,111	410	2,521	1,311	215	1,526	4,047
				Female				
M	2	26	12	38	32	2	34	72
L	3	107	36	143	153	16	169	312
K	4	237	85	322	169	34	203	525
J	5	116	51	167	167	25	192	359
I	6	45	15	60	22	2	24	84
H	7	80	1	81	27	-	27	108
G	8	10	-	10	69	3	72	82
F	9	5	-	5	15	-	15	20
E	10	18	-	18	5	-	5	23
Other	10+	22	-	22	-	-	-	22
Total		666	200	866	659	82	741	1,607
				September				
				Male				
M	2	6	-	6	1	-	1	7
L	3	3	-	3	-	-	-	3
K	4	7	-	7	1	-	1	8
Total		16	-	16	2	-	2	18
				Female				
M	2	4	-	4	1	-	1	5
L	3	7	-	7	6	-	6	13
K	4	54	-	54	5	-	5	59
J	5	78	-	78	77	-	77	155
I	6	29	-	29	11	-	11	40
H	7	79	-	79	19	-	19	98
G	8	14	-	14	25	-	25	39
F	9	7	-	7	4	-	4	11
E	10	18	-	18	-	-	-	18
Other	10+	25	-	25	-	-	-	25
Total		315	-	315	148	-	148	463

TABLE 14.--Soviet tags recovered from the kills, Pribilof Islands, Alaska, 1962

Date	Tag number	Age	Sex	Island of tagging	Rookery of recovery	Length	Weight
			St. Paul Island				
		Years				*Cm.*	*Kg.*
19 July	E 10354	2	♂	Bering	ZAP	101.0	18.0
22 "	C 15048	3	♂	Commander	NEP	--	--
24 "	C 18022	3	♂	"	ZAP	118.0	29.2
26 "	C 20428	3	♂	"	POL	111.0	24.4
1 August	C 20444	3	♂	"	NEP	110.0	30.0
21 "	C 7372	3	♂	Robben	NEP	112.5	23.8
9 July	B 480	4	♂	Commander	NEP	--	--
17 "	B 3012	4	♂	"	ZAP	--	--
19 "	B 4982	4	♂	"	ZAP	--	--
2 August	B 4091	4	♂	"	TOL	112.0	34.6
13 "	C 56320	2	♂	"	NEP	--	--
16 "	C 60180	2	♂	"	ZAP	105.0	22.8
21 "	C 82450	2	♂	"	NEP	--	--
23 "	C 24720	2	♀	Medny	ZAP REEF	95.5	14.4
14 "	C 14418	3	♀	Commander	NEP	111.5	21.6
22 "	B 3047	4	♀	"	ZAP REEF	114.0	25.1
			St. George Island				
22 August	C 51310	2	♂	Commander	EAST	--	--
20 "	C 13170	3	♀	"	ZAP	--	--
20 "	C 14958	3	♀	"	ZAP	--	--
21 "	B 140	4	♀	"	NOR	--	--

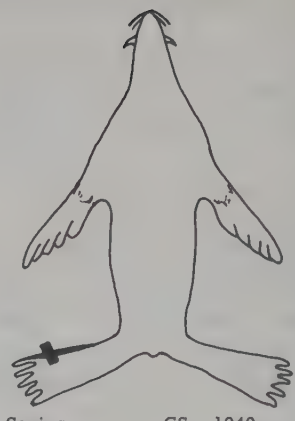
TABLE 15.--Fur seal pup tagging, Pribilof Islands, Alaska, 1962

Date	Rookery	Proportion allotment	Number and series allotment	Tags spoiled	Pups
			St. Paul Island		
		Percent		*Number*	*Number*
28 August and 4 September	Reef	24.8	9,900 017801-27700	8	9,892
27 and 31 August	Polovina	10.2	4,100 027701-31800	3	4,097
27 August	Little Polovina	3.2	1,300 031801-33100	-	1,300
29 August and 4 and 5 September	Northeast Point	24.2	9,700 033101-42800	24	9,676
30 August	Tolstoi	10.0	4,000 042801-46800	4	3,996
31 August	Lukanin-Kitovi	8.0	3,200 046801-50000	1	3,199
30 and 31 August	Zapadni	10.8	4,300 010001-14300	25	4,275
27 and 31 August	Zapadni Reef and Little Zapadni	8.8	3,500 014301-17800	7	3,493
		Total		72	39,928
			St. George Island		
27 August	Zapadni	25.0	2,500 01-2500	4	2,496
27 "	North	42.0	4,200 05801-10000	9	4,191
28 "	Staraya	13.0	1,300 02501-3800	4	1,296
28 "	East	20.0	2,000 03801-5800	3	1,997
		Total		20	9,980
			Grand total	92	49,908

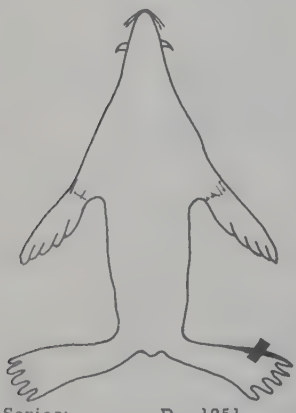


Series: A - 1947
Tag location: left front flipper
Check mark: 1/4" hole in hind left flipper
Number tagged: 19183

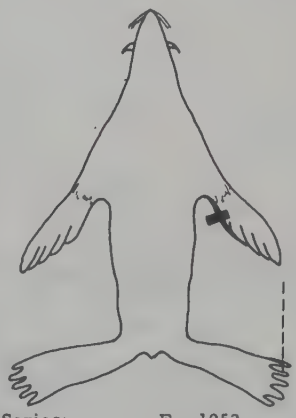
Series: B - 1948
Tag location: left front flipper
Check mark: none
Number tagged: 19532



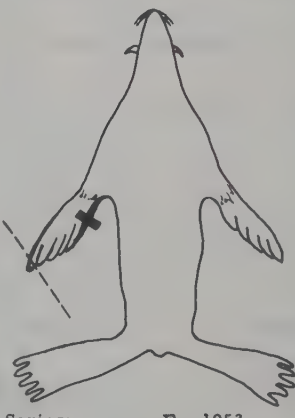
Series: CS - 1949
Tag location: left hind flipper
Check mark: none
Number tagged: 19960



Series: D - 1951
Tag location: right hind flipper
Check mark: none
Number tagged: 1000



Series: E - 1952
Tag location: right front flipper
Check mark: tip of digit on right hind flipper sliced off
Number tagged: 19979

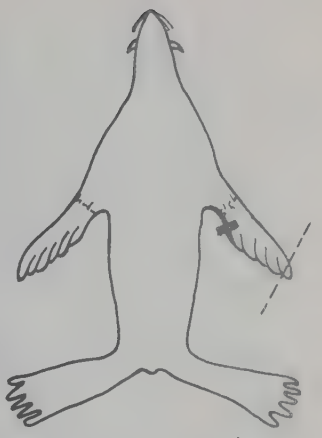


Series: F - 1953
Tag location: left front flipper
Check mark: tip of left front flipper sliced off
Number tagged: 10388
G - 1953 70001-7400

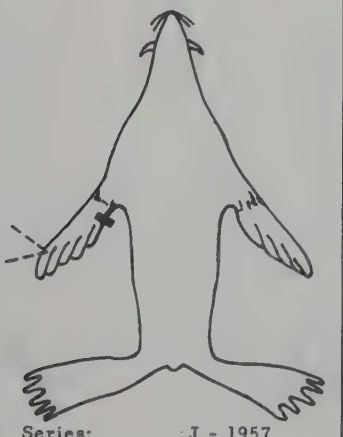
Figure 5.--Tag and checkmark locations, fur seal pup tagging, Pribilof Islands, Alaska, 1947-62.

Series: G - 1954
Tag location: right front flipper
Check mark: "V" notch on right front flipper
Number tagged: 10000

Series: H - 1955
Tag location: left front flipper
Check mark: tip of digit on left hand flipper sliced off
Number tagged: 49870 No letter
H-1955 1-10000 10001-50000

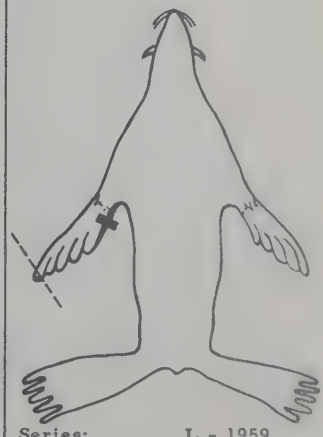


Series: I - 1956
Tag location: right front flipper
Check mark: tip of right front flipper sliced off
Number tagged: 49794



Series: J - 1957
Tag location: left front flipper
Check mark: "V" notch on left front flipper
Number tagged: 49842

Series: K - 1958
Tag location: right front flipper
Check mark: "V" notch on right front flipper
Number tagged: 49917



Series: L - 1959
Tag location: left front flipper
Check mark: tip of left front flipper sliced off
Number tagged: 49881

Figure 5.--Tag and checkmark locations, fur seal pup tagging, Pribilof Islands, Alaska, 1947-62.--Continued

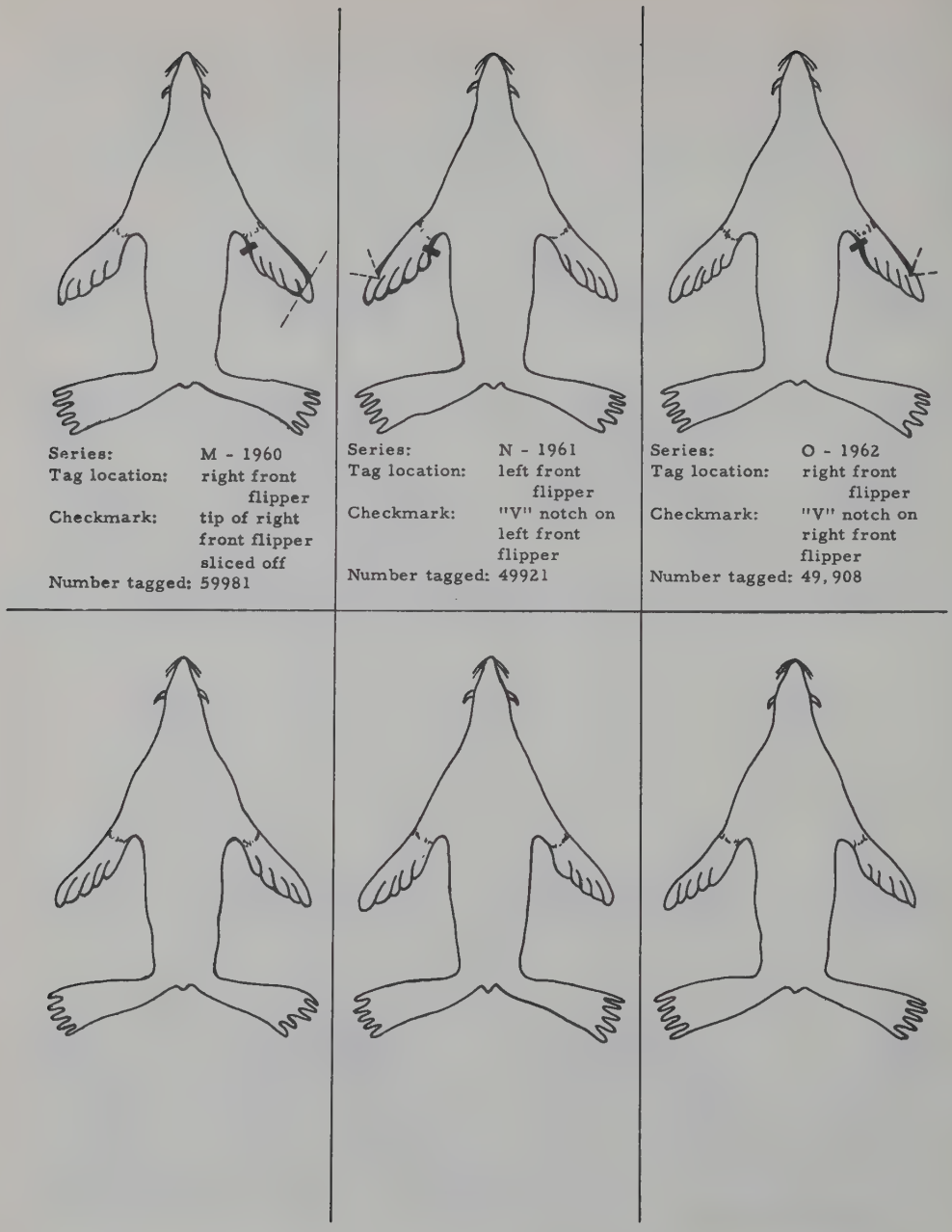

Series: M - 1960
Tag location: right front flipper
Checkmark: tip of right front flipper sliced off
Number tagged: 59981
Series: N - 1961
Tag location: left front flipper
Checkmark: "V" notch on left front flipper
Number tagged: 49921
Series: O - 1962
Tag location: right front flipper
Checkmark: "V" notch on right front flipper
Number tagged: 49,908

Figure 5.--Tag and checkmark locations, fur seal pup tagging, Pribilof Islands, Alaska, 1947-62.--Continued

TABLE 16.--Seals tagged as yearlings in 1961 and recovered from the kill, St. Paul Island, 1962

Tag number	Sex	Age	Rookery	
			Tagged	Recovered
M 88	♀	3	ZAP	NEP
M 195	♀	3	ZAP	ZAP
M 247	♀	3	ZAP	ZAP
M 270	♂	3	REEF	REEF
M 286	♀	3	REEF	REEF
M 327	♀	3	NEP	NEP
M 347	♀	3	NEP	NEP
M 431	♂	3	REEF	REEF
M 436	♀	3	REEF	REEF
M 467	♀	3	POL	NEP
M 469	♀	3	POL	POL
M 479	♀	3	REEF	REEF
M 488	♀	3	REEF	REEF
M 547	♂	3	POL	POL
M 553	♀	3	REEF	ZAP
M 603	♂	3	ZAP	ZAP
M 765	♂	3	POL	POL
M 767	♂	3	POL	REEF
M 818	♂	3	ZAP	ZAP
M 1112	♂	3	POL	POL
Tags lost[1]	♀	3	-	REEF
Tags lost[1]	♀	3	-	NEP
Tags lost[1]	♀	2	-	REEF

[1] Recognition as a "tagged yearling" based on evidence of healed tag scar on each front flipper.

Figure 6.--Measuring a "yearling" seal selected for tagging, St. Paul Island, 1962.

Figure 7.--Tagging a seal selected as a yearling, St. Paul Island, 1962

TABLE 17.--Number of seals selected for yearling tagging, by sex and rookery, St. Paul Island, 1962

[Numbers in parenthesis indicate known-age yearlings]

Rookery	Males	Females	Totals
Zapadni	116 (17)	63 (8)	179 (25)
Little Zapadni	14 (1)	13 (0)	27 (1)
Zapadni Reef	20 (1)	12 (3)	32 (4)
Reef	99 (14)	59 (2)	158 (16)
Northeast Point	121 (30)	71 (6)	192 (36)
Polovina[1]	27 (3)	26 (0)	53 (3)
Tolstoi[2]	92 (17)	55 (8)	147 (25)
Lukanin-Kitovi	40 (15)	11 (3)	51 (18)
Total	529 (98)	310 (30)	839 (128)

[1] Includes Polovina Sands hauling ground.
[2] Includes Tolstoi Sands hauling ground.

TABLE 18.--Sex ratios among selected and known-age yearlings, St. Paul Island, 1941 and 1961-62

Year	Selected yearlings	Known-age yearlings
1941	-	684♂♂::100♀♀(41::6)
1961	23♂♂::100♀♀(139::601)	475♂♂::100♀♀(19::4)
1962	171♂♂::100♀♀(529::310)	327♂♂::100♀♀(98::30)

95 centimeters and only six males exceeded 100 centimeters. These maximum lengths governed selection of yearlings in 1962. However, three males and four females exceeding these limits were tagged because their pelage color was similar to that of known-age yearlings.

Body lengths of selected and known-age yearling males and females are compared in figure 10. Although the length distribution of selected yearlings correlates closely with that of known-age yearlings, bias may exist as a result of imposing maximum length limits on selected yearlings.

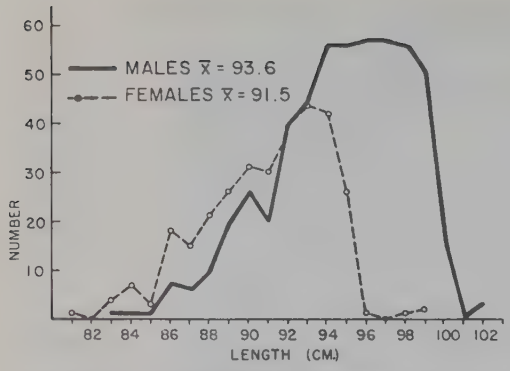


Figure 8.--Distribution of body lengths among 839 selected yearlings, St. Paul Island, 1962.

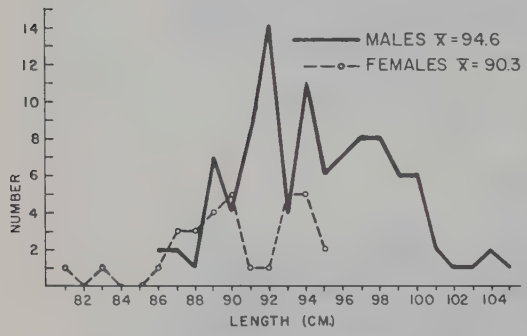


Figure 9.--Distribution of body lengths among 134 known-age yearlings, St. Paul Island, 1962.

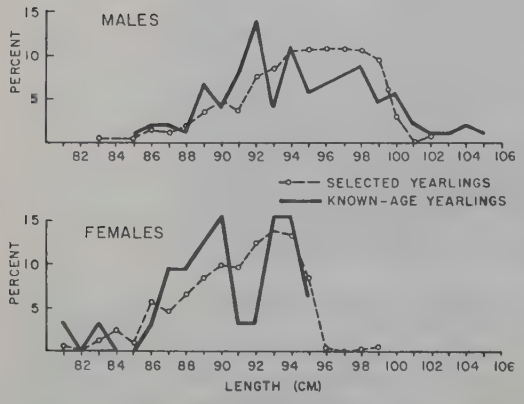


Figure 10.--Body length comparisons of selected and known-age yearlings, St. Paul Island, 1962.

Details on the recovery in 1962 of yearling fur seals tagged as pups in 1961 are given in table 19. Homing tendency of known-age yearlings (table 20) was determined as the percent recovered on the rookery of tagging or birth. An average of 80 percent of the known-age yearlings observed in 1962 returned to the rookery of tagging or birth. Sixteen known-age yearlings were observed in 1961; 12 or 75 percent had returned to the home rookery.

Discussion.--Experience in 1962 indicates that yearlings appear earlier in the fall than expected. Yearlings became abundant enough by the third week of September for tagging operations to begin, whereas, formerly it was believed that few arrived before mid-October.

The likely reason for the discrepancy between sex ratios for the years 1941 and 1962, and 1961 is that of misidentification and tagging of 2-year-old females in 1961. Use of body length rather than weight as a criterion of age in 1962 may have eliminated error in identification of yearlings.

It was also thought in 1961 that yearlings could be distinguished from 2- and 3-year-old seals by the light colored under fur on the back region. But it was found that some marked yearlings had dark colored underfur. From the practical standpoint, seals were sometimes so covered with rookery mud that it was difficult to determine the underfur color.

Although only 967 yearlings were tagged in 7.5 days, twice this number could have been handled if a larger and more efficient crew had been used. Three days of tagging each week would preferable to five, since all the rookeries can be visited and tagging completed in 2 days. A short interval of time is needed for new arrivals to accumulate and for overlooked or escaped yearlings to return.

A period of 1.5 months (the approximate duration yearlings are present on the islands) would be needed to tag 5,000 yearlings.

TABLE 19.--Recovery of yearling fur seals tagged as pups in 1961, St. Paul Island, 1962

Tag number	Sex	Rookery recovered	Rookery tagged	Tag number	Sex	Rookery recovered	Rookery tagged	Tag number	Sex	Rookery recovered	Rookery tagged
N 10090	♀	Zapadni	Zapadni	N 14078	♂	Polovina	Little Zapadni and Zapadni Reef	N 42534	♂	Northeast Point	Northeast Point
N 10459	♂	"	"					N 42846	♂	"	"
N 10574	♂	"	"					N 49136	♂	"	Lukanin-Kitovi
N 10954	♂	"	"	N 28010	♂	"	Polovina	N 13399	♂	Lukanin-Kitovi	Zapadni
N 11083	♂	"	"	N 13393	♂	Tolstoi	Zapadni	N 14380	♂	"	Little Zapadni and Zapadni Reef
N 11125	♂	"	"	N 43007	♀	"	Tolstoi	N 15275	♂	"	"
N 11127	♂	"	"	N 43310	♂	"	"	N 17475	♂	"	Reef
N 11870	♂	"	"	N 44069	♂	"	"	N 25460	♂	"	"
N 12112	♂	"	"	N 44082	♂	"	"	N 25984	♀	"	"
N 12165	♂	"	"	N 44540	♂	"	"	N 33203	♂	"	Northeast Point
N 12462	♂	"	"	N 44658	♂	"	"	N 44242	♂	"	Tolstoi
N 12592	♀	"	"	N 44814	♀	"	"	N 47602	♂	"	Lukanin-Kitovi
N 12769	♀	"	"	N 44825	♀	"	"	N 48050	♂	"	"
N 12955	♂	"	"	N 44871	♂	"	"	N 48306	♂	"	"
N 12972	♀	"	"	N 45252	♂	"	"	N 48475	♀	"	"
N 13275	♂	"	"	N 45346	♂	"	"	N 49059	♂	"	"
N 13500	♂	"	"	N 45383	♀	"	"	N 49133	♂	"	"
N 13586	♂	"	"	N 45459	♂	"	"	N 49517	♂	"	"
N 13611	♂	"	"	N 45637	♀	"	"	N 14458	♀	Little Zapadni and Zapadni Reef	Little Zapadni and Zapadni Reef
N 19614	♀	"	Reef	N 45674	♂	"	"	N 15707	♂	"	"
N 20249	♀	"	"	N 45714	♀	"	"	N 16717	♂	"	"
N 26884	♂	"	"	N 45753	♂	"	"	N 16739	♂	"	"
N 11155	♂	Northeast Point	Zapadni	N 45858	♀	"	"	N 40602	♀	"	Northeast Point
N 15460	♂	"	Little Zapadni and Zapadni Reef	N 45982	♂	"	"	N 44915	♂	"	Tolstoi
N 24351	♂	"	Reef	N 46185	♂	"	"	N 20877	♂	Reef	Reef
N 31861	♂	"	Polovina	N 46284	♂	"	"	N 22140	♀	"	"
N 32020	♂	"	"	N 46685	♂	"	"	N 22468	♂	"	"
N 33372	♂	"	Northeast Point	N 46957	♀	"	"	N 22822	♂	"	"
N 34129	♂	"	"	N 47000	♂	"	"	N 22893	♂	"	"
N 35147	--	"	"	N 38828	♂	Northeast Point	Northeast Point	N 23046	♂	"	"
N 35173	♂	"	"	N 38996	♀	"	"	N 23185	♂	"	"
N 35283	♂	"	"	N 39299	♂	"	"	N 23542	♂	"	"
N 35552	♂	"	"	N 39570	♂	"	"	N 25378	♂	"	"
N 37295	♂	"	"	N 40018	♂	"	"	N 45258	♂	"	Tolstoi
N 37455	♂	"	"	N 40102	♂	"	"				
N 38094	♂	"	"	N 40354	♂	"	"				
N 38440	♂	"	"	N 40562	♀	"	"				
N 38805	♀	"	"	N 40815	♂	"	"				
				N 40860	♀	"	"				
				N 41707	♂	"	"				
				N 42001	♂	"	"				

TABLE 20.--Homing tendency of yearling fur seals tagged as pups in 1961, by rookery, St. Paul Island, 1962

Rookery	Percent
Zapadni	86
Little Zapadni and Zapadni Reef	67
Reef	90
Tolstoi	96
Lukanin-Kitovi	47
Northeast Point	81
Polovina	50

Appraisal of Problems Involved in Tagging and Tag Recoveries

Several factors that bias population estimates were presented in the report for 1959[6] and evaluated in subsequent reports.[7 8] Changes made or needed to improve the marking techniques are given in the following discussion:

Quality of tags.--Style 19M tags furnished by the manufacturer for put tagging in 1960, 1961, and 1962 were less than satisfactory. Clinching failure was the primary problem. Clinching failure was partially eliminated in 1962 by modifying the tagging pliers to fit more precisely the contour of the tag. Because nearly 100 percent clinching success was observed among the manufacturer's new style 49M tags used on yearling seals in 1962, this style will be used for pup tagging in 1963.

Effects of tagging.--The mortality rate for tagged pups was higher than that for untagged pups during the period from 2 to 6 days after tagging. Post-mortem examinations of 48 dead tagged pups showed that 34 or 71 percent had a heavy layer of blubber while 14 or 4 percent had little or no blubber; 38 or 79 percent of the dead tagged pups examined had cardiac lesions indicative of acute congestive heart failure. It follows that weight is a factor in mortality of tagged pups. Over-exertion of heavy pups as a result of their being forced to travel some distance during the tagging operation appears to produce heart failure. Other possible causes of mortality of tagged pups are gas gangrene from infected tag wounds, skull fractures sustained during tagging, and enteritis. The latter may be triggered by the stress of tagging operations.

In 1960, the effects of tagging on pup mortality were studied,[9] and the effects were measured by clearing the dead pups from the areas just prior to tagging, then tagging pups on the areas and periodically clearing the rookeries of dead pups and recording the number of tagged and untagged dead pups. The rookeries were sampled to get an estimate of the tag ratio among live pups but no conclusions were made. The results from the two areas were contradictory.

A similar plan was followed during the 1962 field season; the data are given in table 21. The data from 1962 show that tagged pups have a higher mortality rate than untagged pups the first week after tagging ($X^2 = 109.8$, $P<.005$). Counts made later than one week after tagging also show that mortality of tagged pups tends to be higher than that of untagged pups, but the difference is not significant.

It was believed that there may be a general increase in pup mortality on the rookeries as a result of the disturbance from pup

[6] Carl E. Abegglen, Alton Y. Roppel, and Ford Wilke. 1959. Alaska Fur Seal Investigations, Pribilof Islands, Alaska, Report of field activities, June-September 1959, Bureau of Commercial Fisheries, Marine Mammal Research, U.S. Fish and Wildlife Service, Seattle, Wash. [Processed.]

[7] See footnote 1, p. 15.

[8] Carl E. Abegglen, Alton Y. Roppel, Ancel M. Johnson, and Ford Wilke. 1961. Fur Seal Investigations, Pribilof Islands, Alaska, Report of field activities, June-November 1961. Bureau of Commercial Fisheries, Marine Mammal Biological Laboratory, U.S. Fish and Wildlife Service, Seattle, Wash. [Processed.]

[9] See footnote 1, page 15.

TABLE 21.--Counts of dead pups on Polovina Flats and Little Polovina before and after tagging, St. Paul Island, 1962

Counts prior to tagging		Counts after tagging				
Date	Total	Date	Tagged		Untagged	Total
			Observed	Expected[1]		
Polovina Flats						
August		September				
8	1,288	2	22	4	22	44
12	227	9	11	3	19	30
18	209	16	5	6	33	38
26	97	24	8	3	15	23
Total	1,821		46		89	135
Little Polovina						
August		September				
9	1,662	2	17	5	30	47
13	273	9	4	3	16	20
18	121	16	7	3	19	26
26	71	24	10	6	36	46
Total	2,127		38		101	139

[1] Expected number of dead tagged pups was calculated from the tag ratio from first fall pup sampling.

tagging, but the counts before and after tagging did not show this to be true. The major portion of pup mortality had occurred prior to the first clearing of the rookeries on 8 and 9 August. Mortality decreased from the first count in early August until mid-September when the total counts were low; there were no changes that were clearly a result of the tagging operation.

Additional observations support the quantitative data presented in table 21. While clearing the rookeries the first week after tagging, the dead tagged pups observed generally were plump. An emaciated animal was exceptional, whereas nearly all the dead untagged pups were emaciated. After the first week it was observed that nearly all the dead pups were emaciated. These observations are interpreted to mean that tagging has an immediate affect on pups, causing mortality to a small percentage of them. Of the total number of tagged pups on Little Polovina rookery, approximately 3 percent were found dead during the study. A similar estimate could not be made for Polovina Flats.

Quality of checkmarks.--The veining chisels formerly used for making the "V" notch checkmarks were replaced in 1962 with veterinary ear-notching instruments. The ear-notching instruments produced a satisfactory checkmark as illustrated in figure 11. Observations during tagging indicated that uniformity of marks was achieved. Checkmarks made with the veining chisels varied considerably in position, in appearance, and in depth (figs. 12 and 13). Use of either tool requires that the mark be made at the distal end of the first digit to avoid cutting into the phalanges.

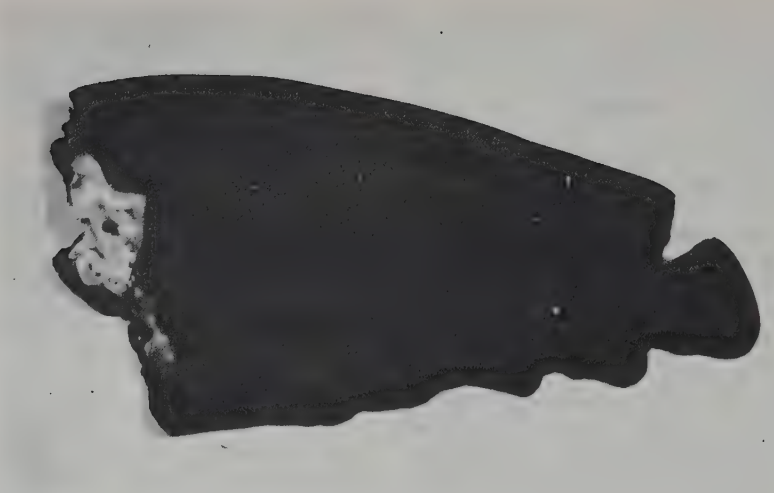


Figure 11.--"V" notch checkmark made with veterinary ear-notching instrument.

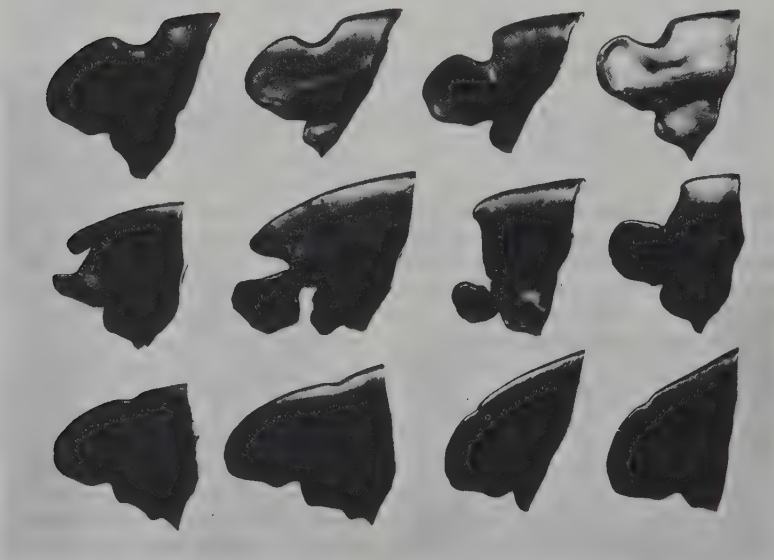


Figure 12.--Variances in "V" notch checkmarks recovered from seals wearing tags.

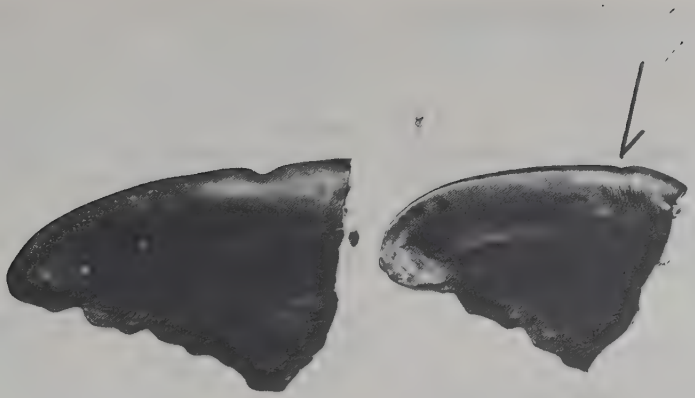


Figure 13.--"V" notch checkmark placed too far from flipper tip.

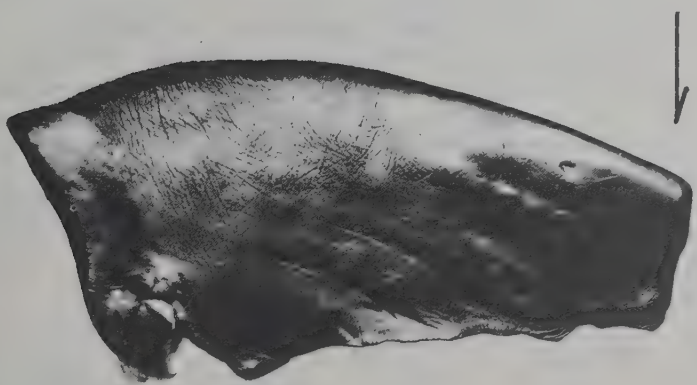


Figure 14.--Slice type of checkmark.

Recovery of tags and checkmarks.--Information developed from the carcass re-examination study begun in 1960[10] shows that few (<0.5 percent) tags are overlooked, that considerable numbers of checkmarks are overlooked, and that the slice type of checkmark (fig. 14) is more easily recognized by the men recovering tags than is the "V" notch checkmark. Carcass re-examination is now a permanent part of the tag and checkmark recovery program.

A comparison of recovered and overlooked checkmarks is made in table 22 for the years 1961 and 1962. Data for 1960 have been omitted in the table because recoveries of

[10] See footnote 1, page 15.

overlooked checkmarks in that year were not separated as to "V" notch or slice. Carcasses were first re-examined on St. George Island in 1962.

Table 23 shows the results of a preliminary check on the number of tagged seals that are without checkmarks. A larger sample will be examined in 1963 to determine the significance of this factor in inflation of population estimates.

Results of Double Tagging

One hundred and fifty-seven of the five thousand pups double tagged in 1958 were examined during the 1962 kill. The tag recovery data are as follows:

Number	Condition
71	No loss of tags
85	Loss of one tag
1	Loss of two tags

Tag loss estimated from double tagging increased from 0.19 in 1961 to 0.34 in 1962. Tag loss estimated from the recovery of checkmarks and tags from 4-year-old males tagged with only one tag was about the same as the estimate from recovery of double tags--0.34 compared to 0.37.

Homing Tendency

Homing tendency of tagged male and female seals is shown in table 24 by age and in table 25 by rookery.

MORTALITY

Mortality among fur seals is considered in two phases, land and ocean. Including both phases, up to 85 percent of the pups born each year are lost prior to reaching age 3. Land mortality, which is measured through annual counts of the dead pups on all rookeries accounts for about one-quarter of the deaths.

TABLE 22.--Checkmarks overlooked compared to the checkmarks available, male seals, Pribilof Islands, Alaska, 1961-62

Year and checkmark type	St. Paul Island			St. George Island		
	Checkmarks available	Checkmarks overlooked		Checkmarks available	Checkmarks overlooked	
	Number	*Number*	*Percent*	*Number*	*Number*	*Percent*
1961						
"V" notch	1,558	481	30.9	--	--	--
Slice	64	17	26.6	--	--	--
1962						
"V" notch	574	258	44.9	88	21	23.9
Slice	737	115	15.6	127	9	7.1

TABLE 23.--Tagged male and female seals without checkmarks, St. Paul Island, 1962

Checkmark type	Tagged seals examined	Tagged seals without checkmarks	
	Number	*Number*	*Percent*
"V" notch	91	6	6.6
Slice	66	2	3.0

TABLE 24.--Homing tendency of male and female seals, by age, Pribilof Islands, Alaska, 1962

Males				Females			
Age	Total recoveries	Recovered home rookery		Age	Total recoveries	Recovered home rookery	
Years		*Number*	*Percent*	*Years*		*Number*	*Percent*
1	1	1	100	1	--	--	--
2	205	85	41	2	42	24	57
3	1,331	586	44	3	150	97	65
4	942	507	54	4	376	296	79
5	56	37	66	5	245	182	74
6	2	--	--	6	89	67	75
				7	160	117	73
				8	24	19	79
				9	12	9	75
				10	36	22	61
				10+	47	34	72

TABLE 25.--Homing tendency of male and female seals, by rookery, Pribilof Islands, Alaska, 1962

St. Paul Island

Rookery of tagging	Males			Females		
	Total recoveries	Recovered home rookery		Total recoveries	Recovered home rookery	
		Number	*Percent*		*Number*	*Percent*
NEP	475	322	68	235	185	79
TOL	250	103	41	163	138	85
L-K	179	32	18	21	--	--
ZAP-1	519	296	57	184	139	76
REEF	473	145	31	265	163	62
POL	274	131	48	120	73	61
Total	2,170	1,029		988	698	
Mean			47			71
St. George Island						
ZAP-2	76	31	41	44	32	73
NOR	154	94	61	103	81	79
EAST	85	48	56	28	19	68
STAR	52	11	21	25	19	76
Total	367	184		200	151	
Mean			50			75

Ocean mortality, which accounts for the remaining three-quarters, can be measured only by the return of survivors to the commercial kill. It is now believed that each age class suffers its heaviest mortality during its first winter at sea.

An understanding of mortality factors and a means of measuring their influence on survival of the year classes are needed for making accurate kill forecasts. The approaches to parts of this problem that have been tried are given in other parts of the report.

Mark C. Keyes, a veterinarian, joined the staff of the Marine Mammal Biological Laboratory on 9 July 1962 to study mortality causes in fur seals. He was on St. Paul Island from 15 August to 10 September to (1) become familiar with fur seal management practices and their relation to mortality studies, (2) survey existing laboratory facilities on St. Paul Island and determine what modifications and supplies would be needed for continued research on mortality, (3) make post-mortem examinations of recently dead or moribund seal pups, (4) evaluate the influence of tagging practices on pup mortality, (5) collect specimen material from seals for histopathologic study, and (6) become familiar with hookworm biology investigations being carried on by O. W. Olsen and E. T. Lyons of Colorado State University. Some preliminary results of work done in 1962 are given below and on page 53. A detailed report on the results of post-mortem examinations and on tagging practices is on file at the Bureau of Commercial Fisheries Marine Mammal Biological Laboratory, Seattle.

Post-mortem examinations of fur seal pups were made from 15 August to 10 September 1962. During this period, pup mortality was relatively light. Starvation was the primary cause of death and enteritis, pneumonia, and pediculosis were considered secondary causes. Hookworm infestations had declined sharply and could not be considered a significant mortality factor.

Gross and microscopic examination of the intestinal contents of a seal pup on St. Paul Island and culture studies of a captive fur seal in Seattle, Wash., indicate that the bacterium *Clostridum perfringens* is a likely agent of enteritis among fur seal pups.

Pneumonia in pups was characterized by mild inflammation, congestion and atelectasis of the lungs, suggesting a virus as the etiological agent. A virus may also be responsible for the prevalence of excessive ophthalmic exudate among fur seal pups.

Pediculosis is widespread among fur seal pups on the rookeries. Because of their ability to cause anemia and transmit disease, lice may be an important factor in mortality.

Dead-pup Counts

Total counts.--Pup mortality in 1962 decreased by 22 percent of the 1961 count on St. Paul Island and by 39 percent on St. George Island. Counts for both islands are given by rookery in table 26. Dead-pup counts made since 1940 are presented in appendix table 31.

Although records are kept of tagged pups found dead on Pacific coast beaches (table 27), the data are incomplete and are not usable for estimating ocean mortality.

Counts on sample areas.--Counts on the sample areas were contained in 1962 as a part of the annual dead-pup count (tables 28 and 29).

Comparison of total dead-pup counts with counts from sample areas, St. Paul Island.--The data from 1956 to 1962 were analyzed to determine how accurately the total number of dead pups can be estimated from the count on the sample areas. Two methods were used: The first was based on the ratio of counts from the sample areas to the total count determined from the 7 years of data; the second was based on a regression equation. Table 30 shows that differences between the estimates for each year and the actual counts are generally less than 5 percent of the latter. The 95 percent confidence limits for either of the estimates are $\pm$ 7,000 or less. Confidence limits of estimates based on the regression equation are generally less than those for

TABLE 26.--Dead-pup counts, Pribilof Islands, Alaska 1962

Rookery	Dead pups
St. Paul Island	
Northeast Point	
Morjovi	4,881
Vostochni	8,565
Polovina	
Little Polovina	2,121
Polovina Cliffs	2,957
Polovina	1,880
Reef	
Ardiguen	225
Gorbatch	1,373
Reef	7,897
Sivutch	--
Kitovi, Lukanin, Tolstoi	
Kitovi	2,081
Lukanin	660
Tolstoi	3,004
Zapadni	
Little Zapadni	2,399
Zapadni Reef	598
Zapadni	6,627
Total	45,268
5 percent addition	2,263
Estimated total	47,531
St. George Island	
North	2,242
Zapadni	1,740
East	504
Staraya Artil	1,435
Total	5,921
5 percent addition	296
Estimated total	6,217
Summary - 1962	
Grand total	51,189
5 percent addition	2,559
Estimated total	53,748

TABLE 27.--Tag recoveries from dead pups or yearlings reported by the public along the Pacific coast, 1948-62

Year recovered	Tag series	Number
1948	A	4
1949	B	2
1950	CS	1
1953	E	1
1954	F	18
1955	GG	8
1956	H	3
1957	I	3
1958	J	21
1959	K	24
1960	L	11
1961	M	21
1962	N	22

TABLE 28.--Dead-pup counts, sample areas, St. Paul Island, 1962

Rookery	Dead pups
Northeast Point	
Morjovi	1,961
Vostochni	1,866
Polovina	
Little Polovina	Not counted separately
Polovina	1,485
Polovina Cliffs	Not counted separately
Reef	
Gorbatch	626
Reef, area 1 (north)	529
Reef, area 2 (south)	1,409
Tolstoi	1,332
Zapadni	
Little Zapadni	791
Zapadni	2,943
Total	12,942

estimates based on the ratio of the count on the sample areas to the total count.

The regression equation used in estimating the total number of dead pups is:

$$Y = 3.3322X - 6,198$$

where

X = count from sample areas

Y = estimate of the total number of dead pups

The estimate based on the ratio can be derived by multiplying the count from the sample areas by 2.998.

TABLE 29.--Percent of complete rookery dead-pup counts represented by sample-area counts, St. Paul Island, 1956-62

Rookery	1956	1957	1958	1959	1960	1961	1962
				Percent			
Morjovi	42.0	33.1	29.8	30.8	45.1	44.8	40.1
Vostochni	20.6	25.1	14.4	29.0	22.7	23.0	21.8
Little Polovina[1]	51.6	55.5	61.3	56.0	51.4	49.0	--
Polovina[1]	26.3	36.6	48.5	42.3	65.7	67.6	--
Gorbatch	33.1	31.0	68.8	38.6	30.0	30.1	45.6
Reef	30.2	25.6	46.3	31.0	26.7	28.2	24.5
Tolstoi	52.3	43.8	48.4	44.9	35.9	40.4	44.3
Little Zapadni	39.2	28.3	30.0	31.6	30.7	32.2	33.0
Zapadni	51.3	52.2	50.9	47.7	51.5	49.7	44.4

[1] Sample areas not counted separately in 1962.

TABLE 30.--Comparison of total dead-pup count and sample areas count, St. Paul Island, 1956-62

Year	Total dead-pup count	Sample areas count	Total dead pups estimated from ratio (total count/sample areas count[1])	Difference of total dead pups estimated with ratio and total dead-pup count	Difference as percentage of total dead-pup count	Total dead pups estimated with regression equation[2]	Difference of total dead pups estimated with equation and total dead-pup count	Difference as percentage of total dead-pup count
	(a)	(b)	(c)	(a)-(c)	[(a)-(c)]/(a)	(d)	(a)-(d)	[(a)-(d)]/(a)
1956	98,707	31,301	93,829	4,878	4.9	98,103	604	.6
1957	61,662	19,729	59,140	2,522	4.1	59,542	2,120	3.4
1958	31,187	11,802	35,378	-4,191	-13.4	33,129	-1,942	-6.2
1959	39,964	14,125	42,341	-2,377	-5.9	40,869	-905	-2.3
1960	62,828	20,374	61,073	1,755	2.8	61,692	1,136	1.8
1961	57,867	20,615	61,796	-3,929	-6.8	62,495	-4,628	-8.0
1962	40,190[3]	12,942	38,795	1,395	3.5	36,927	3,263	8.1
Total	392,405	130,888	392,352	53		392,757	352	

[1] Ratio used for estimate was: 7 years total dead-pup counts (392,405)/ 7 years total sample-areas count (130,888).

[2] Regression equation used for estimate was: $Y = 3.3322X - 6198$.

[3] Count does not include Polovina Cliffs and Little Polovina.

The mean air temperature for St. Paul Island for the 12-month period, 1 July to 30 June, and the total count of dead pups in the following August continue to show a significant inverse relationship, $r = -.757$, $P<.01$ (fig. 15). This relationship cannot be explained.

Prior to the recent discovery that hookworm larvae are transmitted from the female to her pup through nursing within a short time after birth, it was believed that an association existed between air temperature and the survival of hookworm larvae in the soil. Since the pups are apparently infected before larvae can enter the female from the soil and migrate to the milk, the influence, if any, of weather on the severity and frequency of infection must come in the preceding year or years. The association between temperature and hookworm infection now seems less reasonable, or at least, more involved. Possibly the air temperature-mortality relationship is fortuitous. It will be necessary to analyze the data more thoroughly and trace the apparent relationship for a longer period before making a conclusion.

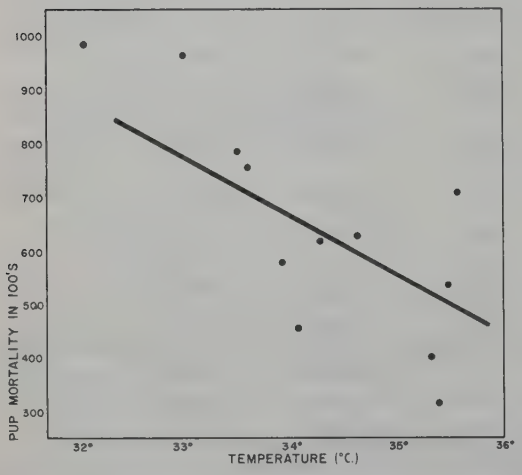


Figure 15.--Pup mortality-air temperature relationship, St. Paul Island.

The recovery of tags during the kill of seals on land has provided data for estimating the number of pups born annually beginning in 1947. Because estimates using this method are necessarily delayed until tags can be recovered 3 and 4 years after birth of the pups, a program to sample pups after tagging was begun in 1961 to provide information on the tagged to untagged ratio among pups in the year of birth. Pup population estimates from both sources of data are presented in the following analysis, although the pup sampling program is still in an early experimental stage.

Estimates from Tagged Males

In 1960 and 1961 the observed tag lost to tagged ratio was higher among animals recovered on St. Paul Island than it was among those recovered on St. George Island. Therefore, the St. Paul Island ratios were used to correct the St. George Island ratios before making the population estimates. Comparative analysis of 1962 tag-recovery data showed that a similar correction for this year was unnecessary. The tag lost to tagged ratios among marked male seals taken in 1960, 1961, and 1962 are presented in table 31. Tables 31 and 32 show that the tag lost to tagged ratio increases with age and that there has been an increase in the ratio in each year class since 1958. An increase in tag loss with age is expected; however, reasons for the increase are not clear. Several factors that were involved are (1) efforts to identify animals that have lost their tags have been improved since 1959, (2) the "V" notch checkmark used in 1958 is often quite difficult to identify, (3) the more easily recognized slice type of checkmark was used on pups tagged in 1959 and 1960, and (4) numerous clinching failures among tags used in 1960 probably resulted in a higher rate of tag loss. Other factors may also have contributed to the increase.

Table 33 shows the population estimates based on tag recoveries for year classes 1958 through 1960. The estimates were calculated using Petersen's formula and treating

TABLE 31.--Tag-lost to tagged ratio among male seals killed, Pribilof Islands, Alaska, 1960-62

Island of recovery and year	Year class	Seals checked		Ratio
		With tag lost	With tag on	
St. Paul 1960	1957	461	1,221	[1].38
St. George 1960		48	257	[1].19
St. Paul 1961		639	900	[1].71
St. George 1961		113	208	[1].54
St. Paul 1962		143	36	3.97
St. George 1962		19	16	1.19
St. Paul 1961	1958	918	2,523	[1].36
St. George 1961		153	456	[1].34
St. Paul 1962		394	753	.523
St. George 1962		60	135	.444
St. Paul 1961	1959	47	97	.485
St. George 1961		8	35	.229
St. Paul 1962		623	1,071	.582
St. George 1962		98	169	.580
St. Paul 1962	1960	43	63	.683
St. George 1962		10	14	.714

[1] See text footnote 8, p. 30.

both islands as a single unit. Estimates based on combined recoveries for the 1958 and 1959 year classes are probably the most accurate. The estimate for the 1960 year class must be considered preliminary as it is based on only 130 tag recoveries.

Table 34 lists the population estimates at time of tagging the dead-pup counts, and the total number of pups born, i.e., the estimate at time of tagging plus the dead-pup counts.

Table 35 gives the estimated total pup population by island. The estimate for each island was calculated on the basis of the estimated pup population at time of tagging, the harem bull count, and the dead-pup count for each island.

Although land mortality among tagged pups is known to exceed that of untagged pups, its effect has not been included in the population estimates (see section "Effects of tagging," p. 30). No reliable estimate of the magnitude of this factor is yet possible. Limited data show that it may be 2 to 3 percent, a figure that would have no appreciable effect on present estimates of the total pup population.

TABLE 32.--Comparisons of tag-lost to tagged ratios, male seals, Pribilof Islands, Alaska

Comparisons	Chi-square	Significance (P)
St. Paul Island vs. St. George Island, 1962 recoveries of the 1957 year class. (Tag loss of 4-year-old males greater on St. Paul.).....	31.2	<.001
1962 vs. 1961, recoveries of 1957 year class on St. Paul Island. (Tag loss of 1957 year class greater at age 5 than at age 4.).....	536	<.001
St. Paul Island vs. St. George Island, 1962 recoveries of 1958 year class. (No difference in tag loss of 1958 year class on St. Paul and St. George Islands in 1962.)	1.59	.23
1962 vs. 1961 recoveries of 1958 year class on St. Paul Island. (Tag loss of 1958 year class greater at age 4 than at age 3.).....	55.8	<.001
St. Paul Island vs. St. George Island, 1962 recoveries of 1959 year class. (No difference in tag loss of 1959 year class on St. Paul and St. George Islands in 1962.).....	.001	>.90
1962 vs. 1961 recoveries of 1959 year class on St. Paul Island. (Tag loss of 1959 year class greater at age 3 than at age 2.).....	20.8	<.001
1958 vs. 1959 year class recoveries on St. Paul Island in 1961 and 1962. (Tag loss of 1959 year class at age 3 greater than tag loss of 1958 year class at age 3.).....	147	<.001
St. Paul Island vs. St. George Island, 1962 recoveries of 1960 year class. (No difference in tag loss of 1960 year class on St. Paul and St. George Islands.).....	.02	.90
1959 vs. 1960 year class recoveries on St. Paul Island in 1961 and 1962. (Tag loss of 1960 year class at age 2 greater than tag loss of 1959 year class at age 2.).....	5.07	.02

TABLE 33.--Estimates of fall pup population from male tag recoveries, Pribilof Islands, Alaska, year classes 1958-60

Year class	Tagged (t)	Year of recoveries	Killed (n)	Tag recoveries (s)	Population estimate
	Number		*Number*	*Number*	*Number*
1958	49,917	1960, 1961 [1]	[1] 57,871	[1] 4,067	[1] 710,141
		1962	17,019	1,342	632,617
		1960, 1961, and 1962 combined	74,890	5,409	691,018
1959	[1] 49,881	1961 [1]	[1] 3,711	[1] 181	[1] 1,017,374
		1962	30,202	1,961	767,883
		1961 and 1962 combined	33,913	2,142	789,407
1960	59,981	1962	952	130	436,358

[1] Douglas G. Chapman, 1961, Preliminary report on the population analysis of the Pribilof fur seal herd. In Carl E. Abegglen, Alton Y. Roppel, Ancel M. Johnson, and Ford Wilke, Fur seal investigations, Pribilof Islands, Alaska. Report of field activities June - November 1961. Bureau of Commercial Fisheries, Marine Mammal Biological Laboratory, U.S. Fish and Wildlife Service, Seattle, Wash. [Processed.]

Estimates from Tagged Females

The fall pup population was estimated for the 1957 through 1960 year classes by the usual method. The significantly higher tag lost to tagged ratio on St. Paul Island was used to correct the lower ratio on St. George Island. The estimates (table 36), calculated using Petersen's formula, were considerably lower than those based on tag recoveries from the male kill. There is no apparent explanation for the difference. The fact that fewer tagged females than tagged males were recovered should not influence the level of the estimate.

Tag lost to tagged ratios among females killed in September on St. Paul Island were very different from the ratios among females taken in August. Probably, there was less effort put into the identification of tag-lost animals taken during the September kill. Partly because of this and partly because the recoveries in September were insufficient as a basis for a separate estimate, only the returns for the period 13-24 August were used in making the pup population estimates.

Estimates of the Fall Pup Population from Fall Tag Ratio

The tag ratio of the 1962 fall pup population on St. Paul Island was estimated twice by counting groups of 25 pups along transect lines systematically distributed on the rookery areas. This method was the most promising of various sampling methods tried in 1960 and 1961. The results of the two counts are given in table 37.

The mean of the estimates from the first and second counts is 231,800 with 95 percent confidence limits of $\pm$53,000.

The highest estimate of the number of pups born on the Pribilof Islands in 1962 is 382,000.

TABLE 34.--Pup population estimates and dead-pup counts, Pribilof Islands, Alaska, year classes 1953-60

Year class	Population at time of tagging	Dead-pup counts	Total pup population
1953	704,000	91,000	795,000
1954	727,000	111,000	838,000
1955	778,000	[1] 79,000	--
1956	872,000	120,000	992,000
1957	637,000	75,000	712,000
1958	691,000	38,000	729,000
1959	789,000	49,000	838,000
1960	436,000	75,000	511,000

[1] Count for St. Paul Island only.

TABLE 35.--Estimates of total pup population, Pribilof Islands, Alaska, year classes 1958-60

Year class	Fall pup population estimate	Island	Distribution of harem bull count	Dead pups	Estimate of total pups
	Number			*Number*	*Number*
1958	691,000	St. Paul	.792	33,000	580,000
		St. George	.208	5,000	149,000
1959	789,000	St. Paul	.798	42,000	672,000
		St. George	.202	7,000	166,000
1960	436,000	St. Paul	.801	66,000	415,000
		St. George	.199	9,000	96,000

This estimate is based on tag ratios obtained from the second count on St. Paul Island and the dead-pup count for both islands. The number of pups allotted to St. George Island is determined by the relative proportion of harem bulls counted on each island. Estimates of the total pup population for the 1958 and 1959 year classes based on tag recoveries from the kill is about twice the highest estimate for the 1962 year class made from fall pup sampling.

There is no reason to believe that the pup population has decreased to the level indicated by the 1962 estimates from fall sampling; therefore, we assume that the estimate from fall sampling is too low, i.e., the tag ratio from sampling is too high.

Obvious factors causing a high tag ratio are: observers tend to count tagged pups and ignore untagged pups; tagged pups have a higher probability of being included in the samples than

TABLE 36.--Estimates of fall pup populations from female kill, Pribilof Islands, Alaska, 13-24 August 1962

Age	Year class	Tagged	Killed	Recovered[1]	Population estimate
Years		*Number*	*Number*	*Number*	*Number*
2	1960	59,981	358	85	250,390
3	1959	49,881	4,037	347	578,803
4	1958	49,917	6,427	552	480,229
5	1957	49,842	3,621	369	487,923

[1] St. George Island recoveries corrected by St. Paul Island tag lost to tagged ratios.

TABLE 37.--Estimates of the pup population, St. Paul Island, year class 1962

Rookery	Seals tagged	First sampling period, 8 and 9 September			Second sampling period, 16 and 17 September		
		Samples	Mean proportion tagged in sample	Estimated pup population at time of tagging	Samples	Mean proportion tagged in sample	Estimated pup population at time of tagging
	Number	*Number*		*Number*	*Number*		*Number*
Reef	9,892	139	0.1872	52,840	157	0.1044	94,750
Polovina	4,097	77	0.1788	22,910	67	0.1771	23,130
Little Polovina	1,300	16	0.1799	7,230	15	0.2887	4,500
Northeast Point	9,676	157	0.2637	36,690	122	0.2368	40,860
Tolstoi	3,996	81	0.2075	19,260	66	0.1677	23,830
Lukanin-Kitovi	3,199	52	0.2683	11,920	57	0.2200	14,540
Zapadni	4,275	79	0.1273	33,580	103	0.1439	29,700
Zapadni Reef and Little Zapadni	3,493	85	0.1819	19,200	77	0.1218	28,680
Total	39,928	686		203,630	664		259,990

do untagged pups. The first factor was believed to be eliminated by experience in counting. At least it can be measured in future years. The second factor is more serious and is the most difficult to eliminate. At the time of tagging, some of the pups are resident at the water's edge or are spending most of their time in the water. When pups are rounded up for tagging, those near or in the water escape and are not tagged. Pups that escape tagging subsequently escape inclusion in the sample counts. Thus, pups available for tagging are the pups counted for determining tag ratios.

SEAL-PUP WEIGHTS

Beginning in 1957, seal pups have been weighed annually on St. Paul Island approximately one week after tagging. Table 38 lists the mean weights in kilograms of tagged and untagged males and females from 1957 through 1962. Appendix tables 26, 27, and 28 list the tag numbers and corresponding weights of the tagged pups, by rookery and by sex.

The main objective of the weighing program is to determine if there is a relationship between mean weights of pups and returns of the year class. An additional 3 to 5 years of data are necessary before this relationship can be determined. However, data through 1961 showed that the mean weight of tagged pups generally was less than that of untagged pups. Consequently, the weighing program was modified in 1962 to include three weighing a month apart, the first about 1 week after tagging. The purpose of additional weighings was to determine if differences in weights of tagged and untagged animals changed by the time pups leave the island.

The data from 1962 (table 39) show that the mean weight of untagged pups for each weighing period is greater than that of tagged pups. The mean weight of untagged pups was significantly greater than that of tagged pups for seven of the eight comparisons within rookeries at the

TABLE 38.--Mean seal-pup weights[1] approximately one week after tagging, St. Paul Island, 1957-62

[In Kilograms]

Group	1957	1958	1959	1960	1961	1962[2]
Males						
Tagged	7.9 (262)	--	9.0 (182)	9.2 (211)	8.0 (186)	8.4 (300)
Untagged	8.7 (391)	11.4 (127)	9.4 (444)	9.8 (372)	8.5 (381)	9.2 (300)
Females						
Tagged	7.4 (196)	--	8.0 (188)	8.4 (254)	7.2 (167)	7.6 (300)
Untagged	7.7 (351)	9.9 (121)	8.1 (386)	9.1 (363)	8.0 (466)	8.2 (300)

[1] Numbers in parentheses are the number of pups in each sample.
[2] Mean weights from first weighing.

TABLE 39.--Mean seal-pup weights, St. Paul Island, 1962

Rookery	Males				Females			
	Untagged		Tagged		Untagged		Tagged	
	Weight	Sample size	Weight	Sample size	Weight	Sample size	Weight	Sample size
			First weighing (2-3 September)					
	Kg.		*Kg.*		*Kg.*		*Kg.*	
NEP	9.64	75	8.92	75	8.18	75	8.20	75
REEF	9.53	75	8.58	75	7.97	75	7.53	75
ZAP	8.83	75	8.17	75	8.47	75	7.12	75
POL	8.70	75	8.10	75	8.06	75	7.46	75
Combined rookeries	9.18	300	8.44	300	8.17	300	7.58	300
			Second weighing (2-3 October)					
NEP	12.21	75	11.45	74	10.65	75	10.06	75
REEF	11.91	75	10.43	70	10.51	75	9.76	71
ZAP	11.88	75	11.87	75	10.63	75	10.53	75
POL	11.64	75	11.02	74	10.10	75	9.67	75
Combined rookeries	11.91	300	11.21	293	10.47	300	10.01	296
			Third weighing (24-25 October)					
NEP	13.92	75	14.01	75	12.67	75	12.34	75
REEF	12.02	75	11.40	75	10.78	75	10.58	75
ZAP	13.72	75	12.77	75	13.20	75	12.38	75
POL	12.05	75	11.72	75	10.50	74	11.00	75
Combined rookeries	12.93	300	12.48	300	11.79	299	11.57	300

TABLE 40.--Probability of no differences in weights of tagged and untagged pups, St. Paul Island, 1962

[In kilograms]

	NEP	REEF	ZAP	POL	Combination[1]
First weighing (2-3 September):					
Males	.04	<.01	.03	<.01	<.01
Females	--	.10	<.01	<.01	<.01
Second weighing (2-3 October):					
Males	.08	<.01	--	.10	<.01
Females	.13	.02	--	.26	.08
Third weighing (24-25 October):					
Males	--	.13	.12	.45	.24
Females	.45	<.50	.07	--	.14

[1] Probability derived by combination method in George W. Snedecor's Statistical methods, p. 271 (see footnote 11, p. 48).

first weighing and for two of the eight at the second weighing (table 39). During the third weighing none of the weight differences within rookeries were significant. There were significant differences in weights between some of the rookeries, therefore the data were analyzed further, using the combination of probabilities described in Snedecor.[11] The results are given in the righthand column of table 40. Weight differences were significant for tagged and untagged males and females at the first weighing and for males at the second weighing. The differences were not significant for females at the second weighing or for either sex at the third weighing.

Differences in weights of pups between rookeries were fairly consistent during the three weighings. Pups from Northeast Point Rookery were consistently above average in weight, while those from Polovina Rookery were consistently below average. Pups from Reef and Zapadni Rookeries varied in weight between these extremes. Pups from a specific rookery have not been consistently heavier or lighter than those from other rookeries from year to year.

The three weighings in 1962 gave some information on the growth rate and total weight gain of pups in autumn. Table 41 lists the changes in mean weights between weighings for the various groups. If the growth rate is constant, 60 percent of the total weight gain would have occurred between the first and second weighing and 40 percent between the second and third weighing. A tendency for a higher than expected percentage of weight gain to occur between the first and second weighing was not significant.

[11] George W. Snedecor. 1956. Statistical methods. The Iowa State College Press, Ames, Iowa, 534 p.

TABLE 41.--Increases in mean weights of pups in September and October, St. Paul Island, 1962

Rookery	Males				Females			
	Tagged		Untagged		Tagged		Untagged	
	Weight	Total increase	Weight	Total increase	Weight	Total increase	Weight	Total increase
				2-3 September to 2-3 October				
	Kg.	*Percent*	*Kg.*	*Percent*	*Kg.*	*Percent*	*Kg.*	*Percent*
NEP	2.53	50	2.57	60	1.86	45	2.47	55
REEF	1.85	66	2.38	96	2.23	73	2.54	90
ZAP	3.70	80	3.05	62	3.41	65	2.16	46
POL	2.92	80	2.94	88	2.21	62	2.04	84
Combined rookeries	2.77	69	2.73	73	2.43	61	2.30	64
				2-3 October to 24-25 October				
NEP	2.56	50	1.71	40	2.28	55	2.02	45
REEF	0.97	34	0.11	4	0.82	27	0.27	10
ZAP	0.90	20	1.84	38	1.85	35	2.57	54
POL	0.70	20	0.41	12	1.33	38	0.40	16
Combined rookeries	1.27	31	1.02	27	1.56	39	1.32	36
				2-3 September to 24-25 October				
NEP	5.09		4.28		4.14		4.49	
REEF	2.82		2.49		3.05		2.81	
ZAP	4.60		4.89		5.26		4.73	
POL	3.62		3.35		3.54		2.44	
Combined rookeries	4.04		3.75		3.99		3.62	

Weight gains of individual animals were determined from 121 tagged pups weighed more than once. Of 22 pups weighed at the first and second weighing, 17 had gained an average of 2.44 kilograms and 5 had lost an average of 0.80 kilograms. Twenty-eight of forty-six animals weighed during both the second and third weighings had gained an average of 2.23 kilograms, 17 had lost an average of 1.38 kilograms and 1 had remained the same. Fifty-three pups were weighed during both the first and third weighings. Of these, 51 gained an average of 3.26 kilograms, 1 lost 1.0 kilograms, and 1 remained the same.

Results of the pup-weighing program show that tagging causes an immediate weight loss and that the loss is at least partially overcome 2 months after tagging. There is a tendency for the rate of gain in weight to decrease

TABLE 42.--Live-pup counts, St. Paul Island, 1959-62

Year	Rookery areas		
	Tolstoi	Kitovi	
	White Cross to No. 16	Amphitheater	Blind to No. 13
1959	702	1,218	979
1960	405	1,211	1,072
1961	558	1,048	942
1962	465	1,067	764

during October. The pups increase in weight by approximately 3.5-4.0 kilograms from early September to late October.

RELATED STUDIES

LIVE-PUP COUNTS

Live-pup counts were made 5 August on selected areas of Tolstoi and Kitovi Rookeries.[12] Counts made during 4 years are compared in table 42.

Correlation of counts with the population trend cannot begin until 1963 when sufficient tag returns will be available to estimate the number of pups born in 1959 and 1960.

SKINS FROM FEMALES

In 1961, numbered stainless steel tags were attached to 117 skins taken from known-age 2-, 3-, 4-, and 5-year-old females to preserve their identify through the killing process. During blubbering, the tags were removed and the numbers permanently imprinted on the flesh side of the skins with indelible pencil. Age, reproductive condition, vibrissal color, body weight, and length measurement data were recorded for each of these females and subsequently related to the finished grade and size of the corresponding skins. The results showed that a substantial proportion of the skins were of commercial quality similar to that of male skins.

This study to relate economic and biological information was continued and expanded in 1962 to include skins from older females because of their possible use in processing requiring shearing. A sample of 188 skins was selected from known-age females 2 through 15 years of age and barreled for experimental use.

DENTITION STUDIES

Little information is available on the dental characteristics of known-age pups. On 28 and 29 June 1962, 100 tags of the series 61-501 to 61-600 were attached to newborn pups on Little Polovina Rookery. Subsequently, one or two pups were collected at intervals of about 10 days. Ten pups, ranging in age from 66 to 103 days, were collected. The aim of the study is to provide specimen material for development of information on (1) the mean date when the last permanent tooth erupts, (2) the mean date when the first molt ends, and (3) length and weight of known-age pups. Weight data will probably be highly variable, since pups are known to vary from 3.3 to 7.1 kilograms at birth.

[12] See footnote 6, page 30.

PELAGE STUDIES

A report "Pelage and surface topography of the northern fur seal" (Scheffer, 1962)[13] was published in February 1962. Another report "Molt in the northern fur seal" (Scheffer and Johnson, 1963)[14] contains a quantative analysis of the timing of molt by age and sex.

EYE-LENS WEIGHT AS AN INDICATOR OF AGE

The eye lens in mammals is believed to grow throughout life. Since 1959, a number of zoologists have published growth curves for lens weight. One of the most extensive studies is one on rabbits made by the Illinois Natural History Survey. In 1962, a collection of lenses from known-age seals (pups to age 17) was saved for the purpose of testing the relationship of age to lens weight. While the lens weight method may not prove useful, a small exploratory study of it will be made.

HOOKWORM STUDIES

Research on hookworm infection of fur seal pups was carried on through a cooperative agreement with Colorado State University from 1959 to 1962. The principal investigator, O. W. Olsen also made studies on hookworms of fur seals from 1951 to 1955. He was assisted by graduate students C. F. Dixon in 1953-54 and E. T. Lyons in 1960-62.

In each of the years 1953-55, hookworm larvae were found to live over winter in the soil. It seemed apparent at first that seal pups were infected through their skin by contact with larvae in the rookery soil.

As a result, experimental treatment of the rookery soil with salt, creosol solutions, and other chemicals was tried as a way of eliminating the larvae. The rate of infection among pups on treated areas did not differ from that of pups on untreated areas.

From 1959 to 1962 larvae apparently did not live over winter but infection of pups by hookworms continued much as in years when the larvae did survive. If larvae are not regularly in the soil until August, seal pups must receive their intestinal infections in some other way. No evidence of prenatal infection could be found in various experiments with pups taken by Caesarean section.

In 1961 several pregnant females were moved and allowed to bear their pups on an area isolated from hookworm infested soil. Their pups became infected. The source of the infection was traced to larvae in the milk. These larvae develop to maturity in the intestines of pups, and eggs are passed with fecal material in about 2 weeks. Free-living, third-stage larvae begin hatching in late August. The free-living larvae penetrate the skin of seals of all ages and migrate to the belly blubber. They grow slightly from the time they enter the skin until they are ingested with milk by a pup. Larvae in the blubber of males and nonpregnant females cannot escape and do not infect pups.

Twenty of twenty-six pregnant females taken at sea in Unimak Pass before they reached the Pribilof Islands contained hookworm larvae in their belly blubber and mammary tissue. Milk samples from seven of eight pregnant females contained larvae. Larvae are in the milk of females for only a short time after parturition; the pups are evidently infected with larvae when they first nurse. The infection rate is very high. Superinfections are possible but do not normally occur because of the short period when infective larvae are in the milk. The conditioning factor that causes part of the larvae from the blubber of a female to migrate to the milk and become infective is not known. Pregnancy hormones are suspected.

Infections of fur seal pups by larvae from the belly blubber of male sea lions were not obtained but would not be expected in the light of present knowledge. Infections of fur seal pups by larvae from a pregnant female sea

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[13] Victor B. Scheffer. 1962. Pelage and surface topography of the northern fur seal. U.S. Fish and Wildlife Service, North American Fauna 64, 206 p.

[14] Victor B. Scheffer and Ancel M. Johnson. 1963. Molt in the northern fur seal. U.S. Fish and Wildlife Service, Special Scientific Report--Fisheries No. 450. In press.

lion are considered possible. Larvae reach the belly blubber of pups 4 to 6 days after entering the pups' flippers. The route of migration may be subcutaneous since none have been found in the blood.

OTHER WILDLIFE SPECIES

SEA LIONS

Sea lion pups were not tagged on Walrus Island in 1962. No recoveries have been made from 100 pups tagged in 1959 and from 530 tagged in 1960.

WHALES

Three dead whales drifted ashore on the Pribilof Islands in 1962, a humpback whale *(Megaptera novaeangliae)* and little piked or minke whale *(Balaenoptera acutorostrata)* on St. George Island and a little piked whale on St. Paul Island.

WALRUS

In 1962, five walruses *(Odobenus rosmarus divergens)* were found dead on beaches of the Pribilof Islands, as follows:

Island	Sex	Age	Date	Location
St. Paul	♂	juvenile	2 July	Lukanin Bay
St. Paul	♀	adult	7 July	Polovina Sands
St. Paul	♂	adult	16 August	East Landing
St. Paul	♂	adult	29 July	Zapadni Reef
St. George	♂	adult	3 September	Garden Cove

SEA OTTER

Donald Boggs, sighted what he identified as a sea otter *(Enhydra lutris)* swimming on its back off Southwest Point, St. Paul Island several times during March, April, and May 1962. If the record is authentic, the animal presumably is one of seven sea otters transplanted to St. Paul Island from Amchitka Island in 1959.

A party of about 20 individuals visited Otter Island in 1 July. No sea otters were observed.

REINDEER

A thorough search of the island on 9 August yielded a total estimate of 726 reindeer, of which 700 were together north of Fox Hill at its base. A single bull was sighted on Ridge Wall, another on the flat south of Crater Hill, and 24 reindeer were located on the flat 300 yards south of Tsammana Lake. The estimate of 726 agrees with a count of 707 obtained 1 July as the reindeer grazed or rested in the approach to the corral on Lake Hill.

The southwest portion of St. Paul Island is showing the effect of overgrazing by the rapidly increasing reindeer herd. A more detailed report on the reindeer herd will be filed by management officials following the autumn harvest which will supply a large amount of meat and keep the size of the reindeer herd at a level where range damage is minimized.

COOPERATIVE STUDIES

The following summaries of work done by cooperators were partially prepared by the cooperator or from information furnished by him.

William G. Reeder and James W. Nybakken from the University of Wisconsin, spent the period 7 to 20 July on St. Paul Island making a preliminary study of fur seal vocal patterns, particularly those contributing to mother-young recognition. Using recording equipment with satisfactory frequency response from about 50 to 15,000 cycles per second, initial recordings were made of the miscellaneous vocalizations typical within the harem; these included sounds associated with male aggression, herding, copulation, female aggression, supplication of male, and pup calling. During the latter part of the study three pregnant females were held in field cages. When two of these gave birth, recordings were made of the vocalization of the female just before parturition, and, more importantly, the mutual calling of mother and young immediately after birth. It was hypothesized that individual patterns and quality of vocalizations were mutually learned at this

time and that knowledge of these patterns contributes to recognition ability during the period when female and pup are associated on a rookery. It is granted that olfactory or other cues may contribute to this recognition. Mother-young mutual calling as the former returned from feeding at sea was also recorded on tape. Preliminary indications show that both male and female fur seals respond positively to play back of certain characteristic calls, thus giving hope that a series of carefully planned observations may allow the determination of the relative extent to which olfactory and auditory cues contribute to recognition between individuals living within the elaborate fur seal social structure. The recordings made this summer are to be used in preparing test tapes to be played to isolated seals in a later series of experiments.

Reeder is also conducting a study to determine age of fur seals from calcium and phosphorous depositions. Skulls, baculae, and flippers were collected and sent to Reeder for this purpose.

Tongues and larynxes from fur seals of several age classes, from fetuses to age 21 years, were collected and sent to Jean A. Pierard, Department of Anatomy, New York State Veterinary College, Cornell University. Pierard is performing a comparative study of tongues and larynxes from animals in the order Carnivora.

An experiment in internal marking of fur seals through fixation of tetracycline antibiotic (terramycin) in the bones and teeth was conducted in 1962. This marking method has been successfully used by fishery biologists in studies of age and of growth rates.

Two female pups were injected peritoneally on 8 July with 145 milligrams of tetracycline per kilogram of body weight, made up by dissolving 45 milligrams of the solid per cubic centimeter of sterile distilled water. The animals were killed on 18 July and frozen. Douglas Weber of the serology section of the Seattle Biological Laboratory will examine the pups for antibiotic fixation.

SUMMARY

Males

1. Beginning on 2 July a total of 53,680 male seals were taken on the Pribilof Islands in 1962; 43,203 were taken on St. Paul Island and 10,477 on St. George Island. Except for efforts to take 4-year-old males during the female kill 13-24 August, the male kill was terminated 5 August. Age classification of the kill in percent was: St. Paul Island, 4, 61, 33, and 2, ages 2-5, respectively; St. George Island, 6, 56, 36, and 2, ages 2-5, respectively.

2. The peak of the kill occurred during round 6 (22-26 July) when 8,577 males were taken on St. Paul Island. The 1962 kill pattern followed that of years before 1960 and 1961. Kills which draw on a relatively strong 3-year-old class, as in 1960 and 1961, have a late peak round.

3. Probably, at least the same proportion of increase in the male kill was possible for the period 1-15 August 1962 as in 1961. If this assumption is correct and the kill had been extended from 5 to 15 August, the total of all ages would have been 60,674, a figure 16 percent less than the 72,500 predicted for 1962.

4. No change has been detected in the return of males that is known to be a result of the removal of females.

5. The pup population, estimated from tag recoveries from males, for the Pribilof Islands for 1958 and 1959 was 729,000 and 838,000, respectively. Estimates based on tagged males were much higher than those based on tagged females. Results of the fall pup sampling program showed that additional development of this technique is necessary before it will provide a reliable estimate of the pup population. The tag lost to tagged ratio increased in 1962 for the 1957 through 1959 year classes. The ratio for the 1960 year class was the highest ever recorded for recoveries of tags made from 2-year-old males.

6. The number of bulls counted decreased from 14,006 harem and 14,280 idle in 1961 to 12,674 harem and 11,759 idle in 1962.

Females

1. Population estimates through the 1959 year class indicate that the female herd exceeds the level necessary for optimum production. However, scarcity of females on the hauling grounds in 1961 and 1962 suggests that the combined effects of natural mortality and commercial killing have achieved a substantial reduction. As many as 47,413 females were easily taken by 20 August (1957); September reduction kills of from 9 to 10 days duration were necessary in 1961 and 1962 to achieve quotas of 43,750. The September kills were in addition to kills ending 15 August in 1961 and 24 August in 1962.

2. From 2 July to 5 August and from 13 to 17 and 20 to 24 August, 28,121 females were killed on the Pribilof Islands in 1962; an additional 15,639 females were killed in September on St. Paul Island.

3. Selective killing for young females in August and old females in September was reflected in the age composition of animals taken on St. Paul Island. In August, 3-, 4-, and 5-year-old females accounted for 55 percent of the kill; in September these ages made up only 24 percent.

4. A progressive increase during the September kill of the proportion of post partum females was attributed to a gradual shift from killing females from the hauling grounds to killing animals taken from rookery fringes or from rookeries.

Tag Recoveries and Tagging

1. Totals of 3,718 tagged seals and 2,417 with checkmarks only were recovered. An additional 20 tags attached to fur seals by Soviet investigators were recovered on the Pribilof Islands.

2. Fifty thousand seal pups were tagged on the right fore flipper with 0-series tags and a "V" notch checkmark was cut into the leading edge near the tip of each tagged flipper.

3. A total of 839 seals was tagged as yearlings in 1962; 128 that had been tagged as pups in 1961 were each given an additional tag. Sex ratios for selected and known-age yearlings were 171♂♂::100♀♀ and 325♂♂::100 ♀♀ respectively. Distribution of body lengths for selected and known-age males and females were similar. Twenty-three animals tagged as yearlings in 1961 were recovered from the kill in 1962; age determination from canine teeth revealed that only one was a yearling when tagged.

Mortality

The 1962 pup mortality decreased to 53,748 from 71,011 in 1961.

Seal-pup Weights

Data collected through 1961 showed that the mean weight of tagged pups was less than that of untagged pups. Three weighings, a month apart, the first 1 week after tagging, were carried out in 1962 to assess the permanency of lighter weight among tagged pups. The data showed that untagged pups were significantly heavier than tagged pups in early September. Untagged pups were still heavier than tagged pups in October but the difference was significant only for males early in the month. The weight of pups increased by 3.5-4.0 kilograms from early September to late October. The rate of gain tended to be greater in September than in October.

Related Studies

The current phase of hookworm research was completed with the 1962 field season and a subsequent report by the contract investigator. It now seems apparent that all fur seals harbor a free-living stage of the parasite in their belly blubber, that the adult seals probably carry the tissue infection throughout their lives, and that pups receive intestinal infections by ingestion with milk.

ACKNOWLEDGMENTS

The research staff acknowledges with appreciation the cooperation given to them by C. Howard Baltzo, Program Director; Roy D. Hurd, St. Paul Island Manager; A. R. Williams, St. George Island Manager; and Stuart Davey, Wildlife Management Biologist, Pribilof Islands.

GLOSSARY

The following terms used in fur seal research and management on the Pribilof Islands have special meanings or are not readily found in standard dictionaries.

checkmark A notch, slit, hole, or other mark made on a seal flipper when a tag is applied, to insure later recognition of an animal which has lost its tag.

clinch or clinching The device or action by which metal tags applied to seal flippers are fastened. A metal point is bent over a narrow band in order to form a closed ring.

drive The act of surrounding and moving groups of seals on land from one location to another.

hauling grounds An area, usually near a rookery, on which nonbreeding animals congregate.

haul out The act of seals moving from the sea to a rookery or hauling grounds on shore.

homing tendency The inclinitation of seals to return to the rookery where they were born. It is expressed as a percentage by comparing the number of tagged seals in a specific group that were found on their natal rookery with the number that were found on some other rookery or island.

known-age Applied to seals for which age is definitely known because they bear an inscribed tag or have a certain combination of tag scar and checkmark.

rookery Breeding ground and nursery where adult males and females form harems, where parturition and impregnation usually take place, and where females nurse their young until autumn.

round The sequence in which hauling grounds on the Pribilof Islands are visited in order to collect seals for harvest. Current practice is to make a complete circuit or round of the hauling grounds in 5 days.

round-up The act of surrounding and collecting seals to be driven for harvest, tagging, or other purposes.

tagged Describes a seal having an inscribed metal tag or tags attached to one or more of its flippers.

tag-lost A term applied to a seal that is known to have been tagged because of a checkmark and, in some cases, a tag scar but no longer has a tag.

tag scar A hole or torn area near the usual tag site on a seal's flipper. Tags fall out because of poor clinching or wear and are torn out by catching in rock crevices or driftwood. Possibly some are torn out by the tagged seal.

tagged to untagged ratio The number of tagged seals compared to the number of untagged seals, usually expressed as a decimal fraction. Example, 5:20, ratio = .25.

tag lost to tag ratio The number of seals that have lost tags as compared with the number retaining tags. Usually expressed as a decimal fraction.

APPENDIX A

PREDICTION OF 1963 MALE RETURNS AND KILL

Douglas G. Chapman
31 October 1962

ESTIMATES OF ESCAPEMENT, 1962

The usual method has been followed, i.e., the estimation of the tail of the normal curve from the kill, by round, of both 3- and 4-year-old male seals on each island. The results are shown in appendix table 1.

The pattern of the kill by round was more irregular than usual in 1962; this casts doubt on use of the method to estimate the postseason escapement. Evidence of unreliability is seen in the large difference in percentage escapements estimated for St. Paul Island and for St. George Island. The estimate for St. Paul Island appears particularly low.

The escapement of undersized seals is estimated from the length distribution (appendix table 25) among 3-year-old males sampled from the kill on St. Paul Island. It appears there is underrepresentation of animals ≤ 41 inches in length. Fitting a truncated normal curve to the observations ≥ 42 inches yields an estimate of escapement (due to size) of 5.0 percent.

Considering the escapement of undersized seals and making the usual adjustment of 17 percent in the escapement estimate for downward bias, the estimated total escapement of 3-year-old males on St. Paul Island in 1962 is 8,726. Correspondingly, the returns from the 1959 year class at age 3 are estimated as 35,182. As noted, this estimate is probably low.

ESTIMATE OF RETURNS FROM DEAD-PUP COUNTS

The relationship between the return of males at age 3 and dead-pup counts is again recalculated, using the corrected 1958 figure. The basic data are given in appendix table 2.

APPENDIX TABLE 1.--Postseason escapement of male seals, Pribilof Islands, Alaska, 1962

Island	Age class	Male kill 2 July to 24 August	Estimated total in killable sizes	Postseason escapement	
		Number	*Number*	*Number*	*Percent*
St. Paul	3	26,456	32,218	6,762	21.0
St. George	3	5,890	9,393	3,503	37.3
St. Paul	4	14,149	14,203	114	0.8
St. George	4	3,707	3,810	103	2.7

APPENDIX TABLE 2.--The return of male seals and the dead-pup counts, St. Paul Island, year classes 1950-51 and 1953-58

Year class	Dead-pup count	Return from year class
1950	56,000	63,000
1951	74,000	60,000
1953	82,000	50,000
1954	101,000	33,000
1955	79,000	41,000
1956	104,000	16,000
1957	65,000	45,000
1958	33,000	67,000

APPENDIX TABLE 3.--Analysis of variance of deviations from linear and quadratic regression of the return of males on the dead-pup counts, St. Paul Island

Source of variation	Sum of squares	Degrees of freedom	Mean square
Deviations from linear regression	511.75	6	
Deviation from quadratic regression	378.14	5	75.6
Difference	133.61	1	

This data is the same as in the 1961 report[1] except for the return of males in 1958. This is now estimated as follows:

2-year-old kill	1,977
3-year-old kill	48,458
4-year-old kill	14,149
Mortality ages 3 to 4	1,415
Escapement adjusted for mortality	125
Total	66,124

The total has been rounded upwards to 67,000 since the escapement estimate is slightly low.

As shown in the 1961 report,[2] a quadratic relationship was fitted to the dead-pup counts and the return of males. Analysis of the revised data indicates that the quadratic relationship is not preferable to that of a simple straight line. This is seen in appendix table 3.

[1] See text footnote 1, table 33, p. 43.

[2] See text footnote 1, table 33, p. 43.

APPENDIX TABLE 4.--The return of male seals and the estimated number of pups born, St. Paul Island

Year class	Average number of pups born	Average return of males at age 3
1920-22	150,000	23,300
1947-49, 1952	508,000	58,800
1953-56	738,000	35,000
1957-58	576,000	56,000

A test of the hypothesis that the quadratic term is not significant follows:

$$F = \frac{133.61}{75.6} = 1.77$$

(5 percent point of F with (1,5) d.f. is 6.61)

Hence, the straight line or linear relationship only has been fitted. The estimated relationship is:

$$N_m = 93.8 - .632D$$

where

N_m = estimated return of males at age 3 (1000's)
D = dead-pup count (1000's).

Applying this to the 1959 and 1960 data we have

1959 D = 42 N_m = 67,300
1960 D = 66 N_m = 52,100.

Considering the returns from the 1959 year class in 1962 the estimate of 67,300 appears high.

ESTIMATE OF RETURNS FROM THE PUP-POPULATION-RETURN EQUATIONS

The relationship between the return of males and the estimated number of pups born was originally noted in the 1959 report.[3] This relationship was subsequently revised, although it was still based on data from returns from year classes through 1955. Since additional data is now available it seems worthwhile to compute a revised estimate of the relationship. This is based on the data in appendix table 4.

As in the original report, data have been grouped by year classes of approximately the same number of pups. The estimated relationships based on this data are:

(1) $N_m = 0.239E - 0.000255E^2$ (Schaefer)
(2) $N_m = 0.0216E^{3/2} - 0.000732E^2$ (Chapman)

where

N_m = male returns at age 3 (1000's)

E = estimated number of pups born (1000's).

The revised equations based on additional data are changed only insignificantly from those given in the 1961 report.[4] These were:

$$N_m = 0.233E - 0.00023E^2$$

$$N_m = 0.0234E^{3/2} - 0.0008E^2.$$

[3] Douglas G. Chapman, appendix B (See text footnote 6, p. 30).

[4] See text footnote 1, table 33, p. 43.

The forecast of returns from the 1959 year class is very similar using either relationship. Substituting E = 672 (the present estimate of the 1959 year class on St. Paul Island) in equation (1), it is seen that N_m = 45.4. Using equation (2), the estimated N_m is 46.0.

FORECAST OF THE KILL OF 4-YEAR-OLD MALES IN 1963

Three forecasts of the kill of 4-year-old males in 1963 are available. They are derived from the estimated escapement of 3-year-old males in 1962, from the pup population-return relationship, and from the dead-pup count-return relationship. Allowing for a 10 percent overwinter mortality and a 5 percent escapement in 1963, the resulting estimates are:

(1) 1962 escapement = 85 percent of 8,726 — 7,400

(2) Pup population-return relationship

Estimated total return 46,700 (average of two methods)

1961 and 1962 kill 29,300

85 percent of balance — 14,800

(3) Dead-pup count-return relationship

Estimated total return 67,300

1961 and 1962 kill 29,300

85 percent of balance — 32,300

Since (1) and (3) appear less reliable, the median estimate of 14,800 is probably the best available.

FORECAST OF THE KILL OF 3-YEAR-OLD MALES IN 1963

The forecast can be based on (1) the dead-pup count-return relationship and (2) the pup population-return relationship (in this case the estimate has to be based on the recoveries of tagged 2-year-olds).

The returns of the 1960 year class based on (1) were estimated above as 52,100. The estimate of the 1960 pup population on St. Paul Island based on tag recoveries in 1962 is 415,000. However, the estimates based on recoveries of tags from 2-year-old males have been unsatisfactory. The estimates, the corresponding estimated returns from equation (2) above, and the actual returns are shown in appendix table 5. The correlation between the estimate and the actual return is -0.42. This is inadequate as a basis for prediction.

An alternative approach has been based on the pup population estimate of the 1959 year class which, for St. Paul Island, is 672,000. In 1959, the kill of females on St. Paul Island totaled 24,000. This should be accompanied by a decline in the number of pups born of about 15,000 (.6 x 24,000). If the 1960 pup population is approximately 657,000, the estimated return is 48,100.

The average of this estimate and the estimate from the dead-pup count is 50,100. As done previously, the actual kill of 3-year-old males may be estimated as 60 percent of 50,100 for 31 July termination, and 80 percent for 15 August termination. The resulting estimates are 30,000 and 40,000, respectively. The total kill will also include some 2- and 5-year-old males. In the past 5 years, the kill has included an average of 2,400 males of these ages.

Hence, the total male kill for St. Paul Island is forcasted as follows:

	Age			Total
	2+5	3	4	
31 July termination	2,000	30,000	15,000	47,000
15 August termination	3,000	40,000	15,000	58,000

If this is 80 percent of the total kill for the Pribilof Islands, the corresponding forecast for both islands is:

31 July termination	59,000
15 August termination	72,000

APPENDIX TABLE 5.--Estimates of the pup population, returns estimated from these estimates, and actual returns of 3-year-old male seals, St. Paul Island, year classes 1952-58

Year class	Estimate of pup population (E_2)	Estimated return based on E_2 using equation (2)	Actual return of 3-year-old males
1952	603,000	54,000	69,000
1953	706,000	40,700	50,000
1954	708,000	40,400	33,000
1955	544,000	57,600	41,000
1956	443,000	58,000	16,000
1957	814,000	17,000	45,000
1958	835,000	11,400	67,000

EVALUATION OF THE FORECAST FOR 1961

The forecast for 1961 predicted a kill of 33,200 3-year-old males by 31 July, or 44,200 by 15 August. Interpolation yields 36,000 as the forecast of the kill to 5 August, the actual termination date. Appendix table 6 compares the forecast with the actual kill on St. Paul Island.

Methods of forecasting the return of 3-year-old males are not yet adequate.

APPENDIX TABLE 6.--Predicted and actual kill of male seals by 5 August, St. Paul Island, 1962

Age class	Forecast of kill in 1961	Actual kill to 5 August
2 and 5	3,000	1,463
3	36,000	25,098
4	11,000	13,422
Total	50,000	39,983

APPENDIX B

APPENDIX TABLE 7.--Age classification of male seals killed, St. Paul Island, 2 July to 5 August, 13-17 and 20-24 August 1962

Date	Rookery	Number		Percent in each age class of sample				Estimated number killed from each age class			
		Males killed	Tooth sample	2	3	4	5	2	3	4	5
2 July	NEP	1,128	110	2	38	58	2	22	429	655	22
3	TZR	595	57	-	47	46	7	-	280	274	41
4	ZAP	1,049	104	-	52	48	-	-	545	504	-
5	REEF-LK	541	53	-	41	55	4	-	222	298	21
6	POL	479	47	-	34	62	4	-	163	297	19
Round total		3,792	371					22	1,639	2,028	103
7 July	NEP	1,815	180	1	37	56	6	18	672	1,017	108
8	TZR	1,243	127	-	60	37	3	-	746	460	37
9	ZAP	1,147	114	-	71	29	-	-	814	333	-
10	REEF-LK	412	40	-	50	48	2	-	206	198	8
11	POL	729	72	-	56	41	3	-	408	299	22
Round total		5,346	533					18	2,846	2,307	175
12 July	NEP	1,387	139	1	49	47	3	14	679	652	42
13	TZR	520	51	2	57	33	8	10	296	172	42
14	ZAP	2,218	218	1	63	35	1	22	1,398	776	22
15	REEF-LK	750	73	3	45	47	5	23	337	353	37
16	POL	829	81	1	54	42	3	8	448	348	25
Round total		5,704	562					77	3,158	2,301	168
17 July	NEP	2,024	203	1	5	39	1	20	1,194	790	20
18	TZR	757	76	4	61	34	1	30	462	257	8
19	ZAP	1,448	144	-	72	28	-	-	1,043	405	-
20	REEF-LK	779	77	1	54	44	1	8	420	343	8
21	POL	725	71	-	64	32	4	-	464	232	29
Round total		5,733	571					58	3,583	2,027	65
22 July	NEP	2,329	238	4	69	26	1	93	1,609	604	23
23	TZR	1,360	136	2	71	26	1	27	966	354	13
24	ZAP	2,296	231	3	71	24	2	69	1,630	551	46
25	REEF-LK	1,186	118	3	70	26	1	36	830	308	12
26	POL	1,406	138	1	74	25	-	14	1,040	352	-
Round total		8,577	861					239	6,075	2,169	94
27 July	NEP	1,901	195	5	66	28	1	95	1,255	532	19
28	TZR	637	64	1	69	30	-	6	440	191	-
29	ZAP	625	63	-	81	17	2	-	506	106	13
30	REEF-LK	716	80	1	67	31	1	7	480	222	7
31	POL	468	48	-	61	35	4	-	285	164	19
Round total		4,347	450					108	2,966	1,215	58
1 August	NEP	1,811	201	3	65	31	1	54	1,177	562	18
2	TZR	2,667	288	3	82	15	-	80	2,187	400	-
3	ZAP	571	76	4	67	29	-	23	382	166	-
4	REEF-LK	1,122	161	7	76	17	-	78	853	191	-
5	POL	313	54	6	74	18	2	19	232	56	6
Round total		6,484	780					254	4,831	1,375	24
13 August	NEP	318	126	17	52	29	2	54	165	92	7
14	NEP	420	172	12	47	36	5	50	198	151	21
15	TOL	604	234	18	45	32	5	109	272	193	30
16	ZAP	426	133	16	55	27	2	68	234	115	9
17	REEF	365	133	32	51	17	-	117	186	62	-
20	POL	222	68	12	47	35	6	27	104	78	13
21	NEP	208	87	60	31	6	3	125	64	13	6
22	TZR	185	73	45	51	4	-	83	94	8	-
23	ZAP	231	68	84	10	6	-	193	23	15	-
24	REEF	17	16	25	75	-	-	4	13	-	-
24	POL	18	4	75	25	-	-	13	5	-	-
Total		3,014	1,114					843	1,358	727	86
Season total		[1] 42,997	5,242					1,619	26,456	14,149	773

[1] Plus 206 unclassified males taken during fall kill of females.

APPENDIX TABLE 8.--Cumulative age classification of male seals killed, St. Paul Island, 2 July to 5 August, 13-17 and 20-24 August 1962

Date	Rookery	Estimated number killed from each age class				Total kill	Percent killed from each age class			
		2	3	4	5		2	3	4	5
2 July	NEP	22	429	655	22	1,128	2	38	58	2
3	TZR	22	709	929	63	1,723	1	41	54	4
4	ZAP	22	1,254	1,433	63	2,772	1	45	52	2
5	REEF-LK	22	1,476	1,731	84	3,313	1	45	52	2
6	POL	22	1,639	2,028	103	3,792	1	43	53	3
7	NEP	40	2,311	3,045	211	5,607	1	41	54	4
8	TZR	40	3,057	3,505	248	6,850	1	45	51	3
9	ZAP	40	3,871	3,838	248	7,997	1	48	48	3
10	REEF-LK	40	4,077	4,036	256	8,409	1	48	48	3
11	POL	40	4,485	4,335	278	9,138	-	49	48	3
12	NEP	54	5,164	4,987	320	10,525	1	49	47	3
13	TZR	64	5,460	5,159	362	11,045	1	49	47	3
14	ZAP	86	6,858	5,935	384	13,263	1	51	45	3
15	REEF-LK	109	7,195	6,288	421	14,013	1	51	45	3
16	POL	117	7,643	6,636	446	14,842	1	51	45	3
17	NEP	137	8,837	7,426	466	16,866	1	52	44	3
18	TZR	167	9,299	7,683	474	17,623	1	53	43	3
19	ZAP	167	10,342	8,088	474	19,071	1	54	42	3
20	REEF-LK	175	10,762	8,431	482	19,850	1	54	42	3
21	POL	175	11,226	8,663	511	20,575	1	55	42	2
22	NEP	268	12,835	9,267	534	22,904	1	56	41	2
23	TZR	295	13,801	9,621	547	24,264	1	57	40	2
24	ZAP	364	15,431	10,172	593	26,560	2	58	38	2
25	REEF-LK	400	16,261	10,480	605	27,746	1	59	38	2
26	POL	414	17,301	10,832	605	29,152	1	59	37	3
27	NEP	509	18,556	11,364	624	31,053	2	60	36	2
28	TZR	515	18,996	11,555	624	31,690	2	60	36	2
29	ZAP	515	19,502	11,661	637	32,315	2	60	36	2
30	REEF	522	19,982	11,883	644	33,031	2	60	36	2
31	POL	522	20,267	12,047	663	33,499	2	60	36	2
1 August	NEP	576	21,444	12,609	681	35,310	1	61	36	2
2	TZR	656	23,631	13,009	681	37,977	2	62	34	2
3	ZAP	679	24,013	13,175	681	38,548	2	62	34	2
4	REEF-LK	757	24,866	13,366	681	39,670	2	62	34	2
5	POL	776	25,098	13,422	687	39,983	2	62	34	2
13	NEP	830	25,263	13,514	694	40,301	2	63	33	2
14	NEP	880	25,461	13,665	715	40,721	2	63	33	2
15	TOL	989	25,733	13,858	745	41,325	2	62	34	2
16	ZAP	1,057	25,967	13,973	754	41,751	3	62	33	2
17	REEF	1,174	26,153	14,035	754	42,116	3	62	33	2
20	POL	1,201	26,257	14,113	767	42,338	3	62	33	2
21	NEP	1,326	26,321	14,126	773	42,546	3	62	33	2
22	TZR	1,409	26,415	14,134	773	42,731	3	62	33	2
23	ZAP	1,602	26,438	14,149	773	42,962	4	61	33	2
24	REEF	1,606	26,451	14,149	773	42,979	4	61	33	2
24	POL	1,619	26,456	14,149	773	[1] 42,997	4	61	33	2

[1] Plus 206 unclassified males taken during fall kill of females.

APPENDIX TABLE 9.--Age classification of male seals killed, St. George Island, 2 July to 5 August, 13-17 and 20-23 August 1962

Date	Rookery	Number		Percent in each age class of sample				Estimated number killed from age class			
		Males killed	Tooth sample	2	3	4	5	2	3	4	5
2 July	ZAP	359	36	-	42	55	3	-	152	197	10
3	NOR	386	39	-	36	61	3	-	138	237	11
4	EAST	240	23	4	43	53	-	9	103	128	-
5	STAR	17	2	-	-	100	-	-	-	17	-
6	NOR	226	23	-	44	52	4	-	99	118	9
Round total		1,228	123					9	492	697	30
7 July	ZAP	235	24	-	42	50	8	-	97	119	19
8	NOR	162	16	-	19	81	-	-	31	131	-
9	EAST	270	29	-	52	48	-	-	141	129	-
10	STAR	25	3	-	34	66	-	-	8	17	-
11	NOR	183	20	-	25	75	-	-	45	138	-
Round total		875	92					-	322	534	19
12 July	ZAP	86	8	-	37	63	-	-	32	54	-
13	NOR	213	21	5	43	48	4	10	91	102	10
14	EAST	442	44	-	70	30	-	-	310	132	-
15	STAR	52	5	-	40	60	-	-	21	31	-
16	NOR	378	37	-	46	49	5	-	174	185	19
Round total		1,171	115					10	628	504	29
17 July	ZAP	401	40	-	40	58	2	-	160	233	8
18	NOR	239	24	-	38	58	4	-	91	139	9
19	EAST	279	28	3	54	36	7	8	151	101	19
20	STAR	59	6	-	66	34	-	-	39	20	-
21	NOR	344	31	-	52	45	3	-	179	155	10
Round total		1,322	129					8	620	648	46
22 July	ZAP	217	22	-	50	48	2	-	108	104	5
23	NOR	160	17	-	47	53	-	-	75	85	-
24	EAST	789	77	3	71	25	1	24	560	197	8
25	STAR	87	9	-	66	34	-	-	57	30	-
26	NOR	391	39	-	66	34	-	-	258	133	-
Round total		1,644	164					24	1,058	549	13
27 July	ZAP	162	15	7	80	13	-	11	130	21	-
28	NOR	127	13	7	39	54	-	9	49	69	-
29	EAST	244	22	-	64	36	-	-	156	88	-
30	STAR	-	-	-	-	-	-	-	-	-	-
31	NOR	459	50	8	60	32	-	37	275	147	-
Round total		992	100					57	610	325	-
1 August	ZAP	314	48	4	59	27	10	12	186	85	31
2	NOR	563	77	4	74	20	2	22	417	113	11
3	EAST	513	72	3	82	15	-	15	420	78	-
4	STAR	225	40	5	80	15	-	11	180	34	-
5	NOR	209	28	4	82	14	-	8	171	30	-
Round total		1,824	265					68	1,374	340	42
13 August	ZAP	335	67	21	58	16	5	70	196	53	16
14	NOR	128	25	36	64	-	-	46	82	-	-
15	EAST	237	24	17	54	12	17	40	128	29	40
16	STAR	144	17	12	76	6	6	17	111	9	7
17	NOR	58	23	22	57	17	4	13	33	10	2
20	ZAP	180	38	55	45	-	-	99	81	-	-
21	NOR	185	66	51	46	3	-	95	85	5	-
22	EAST	86	27	67	33	-	-	57	29	-	-
23	STAR	68	15	33	61	6	-	23	41	4	-
Total		1,421	302					460	786	110	65
Season total		10,477	1,290					636	5,890	3,707	244

APPENDIX TABLE 10.--Cumulative age classification of male seals killed, St. George Island, 2 July to 5 August, 13-17 and 20-23 August 1962

Date	Rookery	Estimated number killed from each age class				Total kill	Percent killed from each age class			
		2	3	4	5		2	3	4	5
2 July	ZAP	-	152	197	10	359	-	42	55	3
3	NOR	-	290	434	21	745	-	39	58	3
4	EAST	9	393	562	21	985	1	40	57	2
5	STAR	9	393	579	21	1,002	1	39	58	2
6	NOR	9	492	697	30	1,228	1	40	57	2
7	ZAP	9	589	816	49	1,463	1	40	56	3
8	NOR	9	620	947	49	1,625	-	39	58	3
9	EAST	9	761	1,076	49	1,895	-	40	57	3
10	STAR	9	769	1,093	49	1,920	-	40	57	3
11	NOR	9	814	1,231	49	2,103	-	39	59	2
12	ZAP	9	846	1,285	49	2,189	-	39	59	2
13	NOR	19	937	1,387	59	2,402	1	39	58	2
14	EAST	19	1,247	1,519	59	2,844	1	44	53	2
15	STAR	19	1,268	1,550	59	2,896	1	44	53	2
16	NOR	19	1,442	1,735	78	3,274	1	44	53	2
17	ZAP	19	1,602	1,968	86	3,675	1	44	53	2
18	NOR	19	1,693	2,107	95	3,914	-	43	54	3
19	EAST	27	1,844	2,208	114	4,193	1	44	53	2
20	STAR	27	1,883	2,228	114	4,252	1	44	53	2
21	NOR	27	2,062	2,383	124	4,596	1	45	51	3
22	ZAP	27	2,170	2,487	129	4,813	1	45	52	2
23	NOR	27	2,245	2,572	129	4,973	1	45	52	2
24	EAST	51	2,805	2,769	137	5,762	1	49	48	2
25	STAR	51	2,862	2,799	137	5,849	1	49	48	2
26	NOR	51	3,120	2,932	137	6,240	1	50	47	2
27	ZAP	62	3,250	2,953	137	6,402	1	51	46	2
28	NOR	71	3,299	3,022	137	6,529	1	51	46	2
29	EAST	71	3,455	3,110	137	6,773	1	51	46	2
30	STAR	71	3,455	3,110	137	6,773	1	51	46	2
31	NOR	108	3,730	3,257	137	7,232	1	52	45	2
1 August	ZAP	120	3,916	3,342	168	7,546	2	52	44	2
2	NOR	142	4,333	3,455	179	8,109	2	53	43	2
3	EAST	157	4,753	3,533	179	8,622	2	55	41	2
4	STAR	168	4,933	3,567	179	8,847	2	56	40	2
5	NOR	176	5,104	3,597	179	9,056	2	56	40	2
13	ZAP	246	5,300	3,650	195	9,391	3	56	39	2
14	NOR	292	5,382	3,650	195	9,519	3	57	38	2
15	EAST	332	5,510	3,679	235	9,756	3	57	38	2
16	STAR	349	5,621	3,688	242	9,900	4	57	37	2
17	NOR	362	5,654	3,698	244	9,958	4	57	37	2
20	ZAP	461	5,735	3,698	244	10,138	5	57	36	2
21	NOR	556	5,820	3,703	244	10,323	5	57	36	2
22	EAST	613	5,849	3,703	244	10,409	6	56	36	2
23	STAR	636	5,890	3,707	244	10,477	6	56	36	2

APPENDIX TABLE 11.--Age classification of male seals killed, Tolstoi and Lukanin-Kitovi Rookeries, St. Paul Island, 1959-62

Rookery	Age	Round 1	2	3	4	5	6	7	8	9	10	11	Total
						1959 Kill							
TOL		125	294	130	122	279	241	347	9	66	36	182	1831
L-K		73	62	118	120	87	149	148	-	-	-	-	757
Total		198	356	248	242	366	390	495	9	66	36	182	2588
						Age Classification							
TOL	2	-	-	-	5	8	5	45	2	44	36	108	253
	3	31	76	38	35	106	106	226	4	15	-	47	684
	4	82	218	87	77	165	125	76	2	7	-	27	866
	5	12	-	5	5	-	5	-	1	-	-	-	28
L-K	2	-	-	-	5	3	3	19	-	-	-	-	30
	3	18	16	34	35	33	66	96	-	-	-	-	298
	4	48	46	79	75	51	77	33	-	-	-	-	409
	5	7	-	5	5	-	3	-	-	-	-	-	20
						1960 Kill							
TOL		103	107	51	346	304	717	183	370	763	39	-	2983
L-K		6	17	29	18	47	75	235	397	274	-	-	1098
Total		109	124	80	364	351	792	418	767	1037	39	-	4081
						Age Classification							
TOL	2	-	-	-	7	15	14	15	26	76	24	-	177
	3	52	89	51	284	265	653	148	329	672	15	-	2558
	4	43	18	-	55	24	50	20	15	15	-	-	240
	5	8	-	-	-	-	-	-	-	-	-	-	8
L-K	2	-	-	-	-	2	2	19	28	27	-	-	78
	3	3	14	29	15	41	68	190	353	241	-	-	954
	4	2	3	-	3	4	5	26	16	6	-	-	65
	5	1	-	-	-	-	-	-	-	-	-	-	1
						1961 Kill							
TOL		-	103	108	104	528	586	723	1362	370	673	-	4557
L-K		-	71	51	95	100	602	276	487	316	-	-	1998
Total		-	174	159	199	628	1188	999	1849	686	673	-	6555
						Age Classification							
TOL	2	-	-	-	-	-	6	14	82	11	54	-	167
	3	-	70	48	42	333	410	528	1116	303	552	-	3402
	4	-	33	60	62	190	164	181	150	52	67	-	959
	5	-	-	-	-	5	6	-	14	4	-	-	29
L-K	2	-	-	-	-	-	6	6	29	10	-	-	51
	3	-	48	22	38	63	421	201	399	259	-	-	1451
	4	-	23	29	57	36	169	69	54	44	-	-	481
	5	-	-	-	-	1	6	-	5	3	-	-	15
						1962 Kill							
TOL		-	308	1008	231	757	1178	468	-	-	-	-	3950
L-K		-	105	172	369	294	735	231	-	-	-	-	1906
Total		-	413	1180	600	1051	1913	699	-	-	-	-	5856
						Age Classification							
TOL	2	-	-	10	-	30	24	10	-	-	-	-	74
	3	-	147	646	141	461	837	332	-	-	-	-	2564
	4	-	139	333	72	258	305	126	-	-	-	-	1233
	5	-	22	19	18	8	12	-	-	-	-	-	79
L-K	2	-	-	-	11	9	29	9	-	-	-	-	58
	3	-	53	91	199	152	551	176	-	-	-	-	1222
	4	-	42	81	159	133	155	37	-	-	-	-	607
	5	-	10	-	-	-	-	9	-	-	-	-	19

Age classification determined from combined Tolstoi, Lukanin-Kitovi samples for each kill at Tolstoi, Lukanin-Kitovi.

APPENDIX TABLE 12.--Age classification of female seals killed, St. Paul Island, 2 July to 5 August, 13-17 and 20-24 August, 6-7, 11-14, and 17-19 September 1962

Date	Rookery	Number Females killed	Number Tooth sample	Number in each age class of sample 2	3	4	5	6	7	8	9	10	10+	Percent in each age class of sample 2	3	4	5	6	7	8	9	10	10+	Estimated number killed from each age class 2	3	4	5	6	7	8	9	10	10+
July																																	
2-27		178	Unclassified																														
28	TZR	17	8	-	-	-	-	1	2	-	-	-	5	-	-	-	-	13	25	-	-	-	62	-	-	-	-	2	4	-	-	-	11
29	ZAP	3	3	-	-	-	-	1	-	-	-	-	2	-	-	-	-	33	-	-	-	-	67	-	-	-	-	1	-	-	-	-	2
30	REEF-LK	79	50	-	-	6	2	1	2	2	2	3	32	-	-	13	5	2	4	4	4	6	62	-	-	11	4	2	3	3	3	5	48
31	POL	14	7	-	-	2	2	-	-	-	-	-	3	-	-	28	28	-	-	-	-	-	44	-	-	4	4	-	-	-	-	-	6
Round total		113	68	-	-	8	4	3	4	2	2	3	42											-	-	15	8	5	7	3	3	5	67
August																																	
1	NEP	220	89	-	-	26	18	8	3	2	6	2	24	-	-	27	20	9	4	3	7	3	27	-	-	59	44	20	9	7	15	7	59
2	TZR	261	83	-	4	18	21	8	4	-	1	3	24	-	5	22	25	10	5	-	1	3	29	-	13	58	65	26	13	-	3	8	75
3	ZAP	182	62	-	2	9	6	4	4	2	2	1	32	-	3	15	10	6	6	3	3	2	52	-	5	27	18	11	11	5	5	4	96
4	REEF	522	169	1	13	56	27	7	8	3	7	4	43	1	8	33	16	4	5	2	4	2	25	5	41	172	84	21	26	11	21	11	130
5	POL	283	80	-	6	32	15	4	3	1	3	4	12	-	7	40	19	5	4	1	4	5	15	-	20	113	54	14	11	3	11	14	43
Round total		1,468	483	1	25	141	87	31	22	8	19	14	135											5	79	429	265	92	70	26	55	44	403
August																																	
13	NEP	1,716	363	3	35	101	43	35	24	20	9	13	80	1	10	28	12	10	7	5	2	3	22	17	172	480	206	172	120	86	34	51	378
14	NEP	1,861	417	1	59	138	57	26	14	13	15	20	74	-	14	33	14	6	3	3	4	5	18	-	260	614	261	112	56	56	74	93	335
15	TOL	2,479	558	2	55	112	101	38	33	31	19	10	157	-	10	20	18	7	6	6	3	2	28	-	248	496	446	174	149	149	74	49	694
16	ZAP	1,466	350	-	57	89	46	23	25	18	12	11	69	-	16	26	13	7	7	5	3	3	20	-	234	381	191	103	103	73	44	44	293
17	REEF	2,084	217	3	49	53	35	11	11	6	7	8	34	1	23	24	16	5	5	3	3	4	16	21	480	500	333	104	104	63	63	83	333
20	POL	1,260	141	1	16	41	29	9	8	5	6	3	23	1	12	29	21	6	6	4	3	2	16	13	151	365	265	76	76	50	38	25	201
21	NEP	1,793	183	4	31	45	23	14	13	13	4	7	29	2	17	25	12	8	7	7	2	4	16	36	305	448	215	143	125	126	36	72	287
22	TOL	988	98	-	16	29	16	6	2	2	4	5	18	-	16	30	16	6	2	2	4	5	19	-	169	298	159	62	19	19	38	48	176
22	ZAP-RF	1,467	150	7	40	39	20	4	4	1	3	2	30	5	26	26	13	3	3	1	2	1	20	64	378	360	193	42	43	11	33	22	321
23	ZAP-RF	1,558	164	9	53	39	17	3	4	4	4	3	28	6	32	24	11	2	2	2	2	2	17	93	499	374	172	31	31	31	31	31	265
23	ZAP	222	25	3	5	5	4	-	-	-	-	-	8	12	20	20	16	-	-	-	-	-	32	27	44	44	36	-	-	-	-	-	71
24	REEF	359	34	1	8	6	5	3	-	1	1	2	7	3	23	18	15	9	-	3	3	6	20	11	82	65	54	32	-	11	11	21	72
24	POL	352	35	-	1	9	4	1	1	1	2	3	13	-	3	26	11	3	3	3	6	8	37	-	10	91	39	11	11	11	21	28	130
Total		17,605	2,735	34	425	706	400	173	139	115	86	87	570											282	3032	4516	2570	1062	837	686	497	567	3556
September																																	
6	NEP	1,984	288	4	8	33	37	31	26	22	22	10	95	1	2	12	13	11	9	8	8	3	33	20	40	239	258	218	177	159	159	60	654
7	ZAP	113	23	-	-	2	2	2	2	2	1	2	10	-	-	9	9	9	9	9	5	9	41	-	-	10	10	10	10	10	7	10	46
7	TZR	420	81	-	1	4	13	6	6	3	6	3	39	-	1	5	16	7	7	4	7	4	49	-	4	21	67	29	29	17	29	17	207
11	POL	293	30	-	-	1	10	3	1	1	2	1	11	-	-	3	34	11	3	3	6	3	37	-	-	9	100	31	9	9	18	9	108
11	ZAP	772	75	-	7	9	11	5	10	7	6	3	17	-	9	12	15	7	13	9	8	4	23	-	69	93	116	54	100	69	62	31	178
11	TOL	345	33	-	-	1	2	5	1	1	4	1	18	-	-	3	6	15	3	3	12	3	55	-	-	10	21	53	10	10	41	10	190
12	NEP	500	48	-	-	6	3	5	3	5	5	2	17	-	-	13	6	10	10	10	10	5	36	-	-	65	30	50	50	50	50	25	180
13	TOL	76	7	-	-	-	2	-	1	1	-	1	2	-	-	-	29	-	14	14	-	14	29	-	-	-	22	-	11	11	-	11	21
13	ZAP	1,068	95	1	2	4	11	6	7	9	10	13	32	1	2	4	12	6	7	9	11	14	34	11	22	44	129	65	75	96	113	150	363
13	REEF	1,081	108	-	2	14	15	10	13	13	5	4	32	-	2	13	14	9	12	12	4	4	30	-	22	141	151	97	130	130	43	43	324
14	NEP	1,443	146	-	1	21	25	17	12	14	13	6	37	-	1	14	17	12	8	10	9	4	25	-	14	203	245	173	115	144	130	58	361
14	POL	66	7	-	-	2	3	1	1	-	-	-	-	-	-	29	43	14	14	-	-	-	-	-	-	19	29	9	9	-	-	-	-
17	TZR	1,425	130	-	-	10	17	19	17	13	10	5	39	-	-	8	13	15	13	10	7	4	30	-	-	114	185	214	185	143	100	57	427
17	REEF	1,084	105	-	3	9	15	11	9	14	12	2	30	-	3	9	14	10	9	13	11	2	29	-	33	98	152	108	98	141	119	22	313
18	POL	1,444	137	-	1	17	22	9	10	12	10	4	52	-	1	12	16	7	7	9	7	3	38	-	14	173	231	101	101	130	101	44	549
18	REEF	1,659	155	-	1	3	14	10	14	20	17	8	68	-	1	2	9	6	9	13	11	5	44	-	17	34	150	99	150	216	182	83	728
19	ZAP	1,866	170	-	6	15	17	18	13	18	13	7	63	-	4	9	10	11	7	11	7	4	37	-	75	168	187	205	131	205	131	75	689
Total		15,639	1,638	5	32	151	219	158	148	155	136	72	562											31	310	1441	2083	1516	1390	1540	1285	705	5338
Season total		35,003	4,924	40	482	1006	710	365	313	280	243	176	1309											318	3421	6401	4926	2675	2304	2255	1840	1321	9364

APPENDIX TABLE 13.--Cumulative age classification of female seals killed, St. Paul Island, 2 July to 5 August, 13-17, 20-24 August, 6-7, 11-14, and 17-19 September 1962

Date	Rookery	Estimated number killed from each age class										Total kill	Percent killed from each age class									
		2	3	4	5	6	7	8	9	10	10+		2	3	4	5	6	7	8	9	10	10+
July																						
28	TZR[1]	-	-	-	-	2	4	-	-	-	11	17	-	-	-	-	12	23	-	-	-	65
29	ZAP	-	-	-	-	3	4	-	-	-	13	20	-	-	-	-	15	20	-	-	-	65
30	REEF-LK[2]	-	-	11	4	5	7	3	3	5	61	99	-	-	11	4	5	7	3	3	5	62
31	POL	-	-	15	8	5	7	3	3	5	67	113	-	-	13	7	5	6	3	3	4	59
August																						
1	NEP	-	-	74	52	25	16	10	18	12	126	333	-	-	22	15	8	5	3	5	4	38
2	TZR	-	13	132	117	51	29	10	21	20	201	594	-	2	22	20	9	5	2	3	3	34
3	ZAP	-	18	159	135	62	40	15	26	24	297	776	-	2	20	17	8	6	2	4	3	38
4	REEF	5	59	331	219	83	66	26	47	35	427	1,298	-	4	26	17	6	5	2	4	3	33
5	POL	5	79	444	273	97	77	29	58	49	470	1,581	-	5	28	17	6	5	2	4	3	30
13	NEP	22	251	924	479	269	197	115	92	100	848	3,297	1	8	28	15	8	6	3	2	3	26
14	NEP	22	511	1,538	740	381	253	171	166	193	1,183	5,158	-	10	30	14	7	5	3	3	5	23
15	TOL	22	759	2,034	1,186	555	402	320	240	242	1,877	7,637	-	10	27	16	7	5	4	3	3	25
16	ZAP	22	993	2,415	1,377	658	505	393	284	286	2,170	9,103	-	11	27	15	7	6	4	3	3	24
17	REEF	43	1,473	2,915	1,710	762	609	456	347	369	2,503	11,187	-	13	26	15	7	6	4	3	3	23
20	POL	56	1,624	3,280	1,975	838	685	506	385	394	2,704	12,447	-	13	26	16	7	6	4	3	3	22
21	NEP	92	1,929	3,728	2,190	981	810	632	421	466	2,991	14,240	1	13	26	16	7	6	4	3	3	21
22	TOL	92	2,098	4,026	2,349	1,043	829	651	459	514	3,167	15,228	1	14	26	16	7	5	4	3	3	21
22	ZR	156	2,476	4,386	2,542	1,085	872	662	492	536	3,488	16,695	1	15	26	15	7	5	4	3	3	21
23	ZR	249	2,975	4,760	2,714	1,116	903	693	523	567	3,753	18,253	1	16	26	15	6	5	4	3	3	21
23	ZAP	276	3,019	4,804	2,750	1,116	903	693	523	567	3,824	18,475	1	16	26	15	6	5	4	3	3	21
24	REEF	287	3,101	4,869	2,804	1,148	903	704	534	588	3,896	18,834	1	16	26	15	6	5	4	3	3	21
24	POL	287	3,111	4,960	2,843	1,159	914	715	555	616	4,026	19,186	1	16	26	15	6	5	4	3	3	21
September																						
6	NEP	307	3,151	5,199	3,101	1,377	1,091	874	714	676	4,680	21,170	1	15	25	15	7	5	4	3	3	22
7	ZAP	307	3,151	5,209	3,111	1,387	1,101	884	721	686	4,726	21,283	1	15	25	15	7	5	4	3	3	22
7	TZR	307	3,155	5,230	3,178	1,416	1,130	901	750	703	4,933	21,703	1	15	24	15	7	5	4	3	3	23
11	POL	307	3,155	5,239	3,278	1,447	1,139	910	768	712	5,041	21,996	1	14	24	15	7	5	4	4	3	23
11	ZAP	307	3,224	5,332	3,394	1,501	1,239	979	830	743	5,219	22,768	1	14	24	15	7	5	4	4	3	23
11	TOL	307	3,224	5,342	3,415	1,554	1,249	989	871	753	5,409	23,113	1	14	23	15	7	5	4	4	3	24
12	NEP	307	3,224	5,407	3,445	1,604	1,299	1,039	921	778	5,589	23,613	1	14	23	15	7	5	4	4	3	24
13	TOL	307	3,224	5,407	3,467	1,604	1,310	1,050	921	789	5,610	23,689	1	14	23	15	7	5	4	4	3	24
13	ZAP	318	3,246	5,451	3,596	1,669	1,385	1,146	1,034	939	5,973	24,757	1	13	22	14	7	6	5	4	4	24
13	REEF	318	3,268	5,592	3,747	1,766	1,515	1,276	1,077	982	6,297	25,838	1	13	22	14	7	6	5	4	4	24
14	NEP	318	3,282	5,795	3,992	1,939	1,630	1,420	1,207	1,040	6,658	27,281	1	12	21	15	7	6	5	4	4	25
14	POL	318	3,282	5,814	4,021	1,948	1,639	1,420	1,207	1,040	6,658	27,347	1	12	21	15	7	6	5	4	4	25
17	TZR	318	3,282	5,928	4,206	2,162	1,824	1,563	1,307	1,097	7,085	28,772	1	11	20	15	8	6	5	5	4	25
17	REEF	318	3,315	6,026	4,358	2,270	1,922	1,704	1,426	1,119	7,398	29,856	1	11	20	14	8	6	6	5	4	25
18	POL	318	3,329	6,199	4,589	2,371	2,023	1,834	1,527	1,163	7,947	31,300	1	11	20	14	8	6	6	5	4	25
18	REEF	318	3,346	6,233	4,739	2,470	2,173	2,050	1,709	1,246	8,675	32,959	1	10	19	14	8	7	6	5	4	26
19	ZAP	318	3,421	6,401	4,926	2,675	2,304	2,255	1,840	1,321	9,364	[3] 34,825	1	10	18	14	8	7	6	5	4	27

[1] Tolstoi and Zapadni Reef.

[2] Reef, Lukanin, and Kitovi.

[3] Plus 178 unclassified females killed 2-27 July.

APPENDIX TABLE 14.--Age classification of female seals killed, St. George Island 2 July to 5August, 13-17 and 20-23 August 1962

Date	Rookery	Number Females killed	Number Tooth sample	Number in each age class of sample 2	3	4	5	6	7	8	9	10	10+	Percent in each age class of sample 2	3	4	5	6	7	8	9	10	10+	Estimated number killed from each age class 2	3	4	5	6	7	8	9	10	10+
July 2-30		25	Unclassified																														
July 31	NOR	19	17	-	-	3	1	1	1	1	3	-	7	-	-	18	6	6	6	6	18	-	40	-	-	4	1	1	1	1	4	-	7
August 1	ZAP	184	25	-	1	1	3	2	2	-	-	2	14	-	4	4	12	8	8	-	-	8	56	-	8	70	53	35	-	-	8	-	77
2	NOR	251	29	-	1	8	6	4	-	-	1	-	9	-	3	28	21	14	-	-	3	-	31	-	8	24	34	24	8	34	11	21	34
3	EAST	198	48	-	2	6	8	6	2	8	3	5	8	-	4	12	17	12	4	17	6	11	17	-	8	24	34	24	8	34	11	21	34
4	STAR	209	62	-	-	14	5	6	2	1	5	4	25	-	-	23	8	10	3	2	8	6	40	-	-	48	17	21	6	4	17	12	84
5	NOR	127	47	-	1	13	9	2	3	-	2	1	16	-	2	28	20	4	6	-	4	2	34	-	2	36	26	5	8	-	5	2	43
Round total		969	211	-	5	42	31	20	9	9	11	12	72											-	25	185	152	100	37	38	41	50	341
August 13	ZAP	530	84	-	2	17	12	5	3	5	5	2	33	-	2	20	14	6	4	6	6	2	40	-	11	106	73	32	21	32	32	11	212
14	NOR	690	129	-	8	26	22	10	13	9	3	2	36	-	6	20	17	8	10	7	2	2	28	-	41	138	118	55	69	48	14	14	193
15	EAST	417	104	-	3	17	18	16	6	4	6	7	27	-	3	16	17	15	6	4	6	7	26	-	13	67	71	62	25	17	25	29	108
16	STAR	894	162	-	15	49	21	13	6	4	5	3	46	-	9	30	13	8	4	2	3	2	29	-	80	268	116	72	36	18	27	18	259
17	NOR	683	68	-	7	16	14	9	4	5	1	1	11	-	10	24	20	13	6	7	2	2	16	-	68	164	137	89	41	48	14	14	108
20	ZAP	1,467	160	1	28	36	17	7	7	10	6	4	44	-	18	23	11	4	4	6	4	2	28	-	264	337	161	59	59	88	59	29	411
21	NOR	1,901	199	3	33	52	25	16	13	10	6	2	39	2	17	26	12	8	6	5	3	1	20	38	323	495	228	152	114	95	57	19	380
22	EAST	745	82	3	15	20	6	2	4	3	2	6	21	4	18	25	7	2	5	4	2	7	26	30	134	186	52	15	37	30	15	52	194
23	STAR	417	52	1	9	19	13	5	1	1	-	-	3	2	17	36	25	10	2	2	-	-	6	8	71	150	104	42	8	8	-	-	26
Total		7,744	1,040	8	120	252	148	83	57	51	34	27	260											76	1005	1911	1060	578	410	384	243	186	1891
Season total		8,757	1,268	8	125	297	180	104	67	61	48	39	339											76	1030	2100	1213	679	448	423	288	236	2239

APPENDIX TABLE 15.--Cumulative age classification of female seals killed, St. George Island, 2 July to 5 August, 13-17 and 20-23 August 1962

Date	Rookery	Estimated number killed from each age class 2	3	4	5	6	7	8	9	10	10+	Total kill	Percent killed from each age class 2	3	4	5	6	7	8	9	10	10+
July 31	NOR	-	-	4	1	1	1	1	4	-	7	19	-	-	21	5	5	5	5	21	-	38
August 1	ZAP	-	7	11	23	16	16	1	4	15	110	203	-	3	5	11	8	8	1	2	8	54
2	NOR	-	15	81	76	51	16	1	12	15	187	454	-	3	18	17	11	4	-	3	3	41
3	EAST	-	23	105	110	75	24	35	23	36	221	652	-	3	16	17	12	4	5	3	6	34
4	STAR	-	23	153	127	96	30	39	40	48	305	861	-	3	18	15	11	3	5	5	5	35
5	NOR	-	25	189	153	101	38	39	45	50	348	988	-	2	19	16	10	4	4	5	5	35
13	ZAP	-	36	295	226	133	59	71	77	61	560	1,518	-	2	19	15	9	4	5	5	4	37
14	NOR	-	77	433	344	188	128	119	91	75	753	2,208	-	3	20	16	9	6	5	4	3	34
15	EAST	-	90	500	415	250	153	136	116	104	861	2,625	-	3	19	16	10	6	5	4	4	33
16	STAR	-	170	768	531	322	189	154	143	122	1,120	3,519	-	5	22	15	9	5	4	4	4	32
17	NOR	-	238	932	668	411	230	202	157	136	1,228	4,202	-	6	22	16	10	5	5	4	3	29
20	ZAP	-	502	1,269	829	470	289	290	216	165	1,639	5,669	-	9	22	15	8	5	5	4	3	29
21	NOR	38	825	1,764	1,057	622	403	385	273	184	2,019	7,570	1	11	23	14	8	5	5	4	2	27
22	EAST	68	959	1,950	1,109	637	440	415	288	236	2,213	8,315	1	12	23	13	8	5	5	3	3	27
23	STAR	76	1,030	2,100	1,213	679	448	423	288	236	2,239	[1] 8,732	1	12	24	14	8	5	5	3	3	25

1 Plus 25 unclassified female seals killed 2-30 July.

APPENDIX TABLE 16.--Reproductive condition of tagged female seals sampled from the kill, St. Paul Island, 13-17 and 20-24 August 1962

	Age in years										
	2	3	4	5	6	7	8	9	10	10+	Total
13 August											
Post partum											
multiparous	-	-	-	-	1	1	-	-	2	1	5
Nonpregnant											
nulliparous	-	5	8	4	-	-	-	-	-	-	17
primiparous	-	-	-	-	-	-	1	-	-	-	1
multiparous	-	-	-	-	-	1	-	1	-	3	5
14 August											
Post partum											
primiparous	-	-	2	-	1	4	-	-	-	-	7
multiparous	-	-	-	-	1	9	-	-	3	1	14
Nonpregnant											
nulliparous	-	7	32	6	4	-	-	-	-	-	49
primiparous	-	-	-	-	-	1	-	-	-	-	1
multiparous	-	-	-	-	-	2	-	-	1	-	3
15 August											
Post partum											
primiparous	-	-	3	7	1	6	-	-	-	-	17
multiparous	-	-	-	-	4	8	2	-	-	1	15
Nonpregnant											
nulliparous	1	16	41	17	3	-	-	-	-	-	78
primiparous	-	-	1	1	-	-	-	-	-	-	2
multiparous	-	-	-	-	3	3	-	-	1	-	7
16 August											
Post partum											
primiparous	-	-	-	4	1	-	-	-	-	-	5
multiparous	-	-	-	-	1	2	1	1	1	1	7
Nonpregnant											
nulliparous	1	6	13	4	-	-	-	-	-	-	24
primiparous	-	-	-	-	-	2	-	-	-	-	2
multiparous	-	-	-	-	-	2	-	-	-	1	3
17 August											
Post partum											
primiparous	-	-	-	3	4	2	-	-	-	-	9
multiparous	-	-	-	-	-	2	-	-	1	-	3
Nonpregnant											
nulliparous	4	21	22	11	1	-	-	-	-	-	59
primiparous	-	-	-	-	1	-	-	-	-	-	1
multiparous	-	-	-	-	-	1	-	-	-	1	2
20 August											
Post partum											
primiparous	-	-	-	2	-	1	-	-	-	-	3
multiparous	-	-	-	-	1	2	-	-	-	3	6
Nonpregnant											
nulliparous	-	4	14	6	1	-	-	-	-	-	25
primiparous	-	-	-	-	-	1	-	-	-	-	1
multiparous	-	-	-	-	-	1	-	-	-	2	3
21 August											
Post partum											
primiparous	-	-	-	3	-	1	-	-	-	-	4
multiparous	-	-	-	-	-	3	-	-	1	-	4
Nonpregnant											
nulliparous	1	5	14	8	3	-	-	-	-	-	31
primiparous	-	-	-	-	-	1	-	-	-	-	1
multiparous	-	-	-	-	-	-	-	1	1	-	2
22 August											
Post partum											
primiparous	-	-	-	2	1	-	-	-	-	-	3
multiparous	-	-	-	-	1	2	1	-	-	1	5
Nonpregnant											
nulliparous	4	16	33	17	1	2	-	-	-	-	73
primiparous	-	-	-	-	1	-	-	-	-	-	1
multiparous	-	-	-	-	-	1	1	-	-	1	3
23 August											
Post partum											
primiparous	-	-	-	2	-	-	-	-	-	-	2
multiparous	-	-	-	-	1	4	-	-	-	-	5
Nonpregnant											
nulliparous	1	18	23	1	-	-	-	-	-	-	43
primiparous	-	-	-	1	1	-	-	-	-	-	2
multiparous	-	-	-	-	-	1	-	-	-	-	1
24 August											
Nonpregnant											
nulliparous	1	2	2	3	-	-	-	-	-	-	8

APPENDIX TABLE 17.--Reproductive condition of female seals sampled from the kill, St. Paul Island, 6, 7, and 11-14 September 1962

	Age in years										
	2	3	4	5	6	7	8	9	10	10+	Total
6 September											
Post partum											
primiparous	-	-	2	12	12	2	1	2	-	5	36
multiparous	-	-	-	2	10	20	16	12	5	51	116
Nonpregnant											
nulliparous	4	10	36	29	10	5	3	2	2	3	104
primiparous	-	-	-	3	3	3	-	1	-	1	11
multiparous	-	-	1	2	1	3	5	5	4	40	61
7 September											
Post partum											
primiparous	-	-	-	2	2	3	1	-	-	1	9
multiparous	-	-	-	3	4	3	4	4	3	29	50
Nonpregnant											
nulliparous	-	1	9	13	2	-	-	-	-	2	27
primiparous	-	-	-	-	-	2	-	-	1	-	3
multiparous	-	-	-	-	-	2	1	3	2	19	27
11 September											
Post partum											
primiparous	-	-	1	13	8	1	1	1	-	-	25
multiparous	-	-	-	-	2	14	4	9	4	34	67
Nonpregnant											
nulliparous	-	6	21	21	5	1	-	-	-	1	55
primiparous	-	-	-	-	-	1	-	-	1	-	2
multiparous	-	-	-	-	1	2	3	3	2	13	24
12 September											
Post partum											
primiparous	-	-	-	4	3	3	-	-	-	-	10
multiparous	-	-	-	-	3	4	5	4	1	15	32
Nonpregnant											
nulliparous	-	-	6	1	1	-	-	2	-	-	10
multiparous	-	-	-	-	-	2	1	-	1	5	9
13 September											
Post partum											
primiparous	-	-	-	7	1	1	-	-	-	-	9
multiparous	-	-	-	-	2	8	8	11	6	22	57
Nonpregnant											
nulliparous	2	4	6	3	1	-	-	-	-	-	16
multiparous	-	-	-	-	-	-	-	-	-	4	4
14 September											
Post partum											
primiparous	-	-	3	12	12	7	8	5	2	4	53
multiparous	-	-	-	1	1	4	5	8	3	22	44
Nonpregnant											
nulliparous	-	1	20	14	6	2	-	-	-	-	43
primiparous	-	-	-	1	-	-	-	-	-	1	2
multiparous	-	-	-	-	-	-	-	-	1	10	11

APPENDIX TABLE 18.--Reproductive condition of tagged female seals sampled from the kill, St. George Island, 3, 5, 13-17, and 20-23 August 1962

	Age in years										
	2	3	4	5	6	7	8	9	10	10+	Total
3 August											
Nonpregnant nulliparous	-	-	-	2	-	-	-	-	-	-	2
5 August											
Nonpregnant nulliparous	-	-	1	-	-	-	-	-	-	-	1
13 August											
Post partum primiparous	-	-	1	-	1	-	-	-	-	-	2
Nonpregnant nulliparous	1	-	3	4	-	-	-	-	-	-	8
14 August											
Post partum primiparous	-	-	1	1	2	-	-	-	-	-	4
Nonpregnant nulliparous	-	3	15	1	1	-	-	-	-	-	20
15 August											
Post partum multiparous	-	-	-	-	-	1	-	-	-	-	1
Nonpregnant nulliparous	-	1	1	5	1	-	-	-	-	-	8
16 August											
Post partum primparous	-	-	-	2	-	-	-	-	-	-	2
Nonpregnant nulliparous	-	-	5	5	2	-	-	-	-	-	12
17 August											
Post partum multiparous	-	-	-	-	1	-	-	-	-	-	1
Nonpregnant nulliparous	-	1	6	2	1	-	-	-	-	-	10
20 August											
Post partum primiparous	-	-	-	3	1	-	-	-	-	-	4
multiparous	-	-	-	1	-	-	-	-	-	-	1
Nonpregnant nulliparous	2	6	12	6	-	-	-	-	-	-	26
multiparous	-	-	-	-	1	-	-	-	-	-	1
21 August											
Post partum primiparous	-	-	-	5	2	-	-	-	-	-	7
Nonpregnant nulliparous	6	15	25	4	-	-	-	-	-	-	50
22 August											
Post partum primiparous	-	-	-	2	1	-	-	-	-	-	3
Nonpregnant nulliparous	3	6	8	6	1	-	-	-	-	-	24
23 August											
Post partum primiparous	-	-	-	1	-	-	-	-	-	-	1
Nonpregnant nulliparous	-	5	7	-	-	-	-	-	-	-	12

APPENDIX TABLE 19.--Number post partum and nonpregnant among tagged and untagged seals 4 or more years old and 5 or more years old sampled from the kill, St. Paul Island, 13-17, 20-24 August, 6, 7, and 11-14 September 1962

Date	Daily sample	Daily sample less 2- and 3-year-olds	Ages 4-10+		Daily sample less 2-, 3-, and 4-year-olds	Ages 5-10+	
			Post partum	Non-pregnant		Post partum	Non-pregnant
				Tagged			
August							
13	28	23	5	18	15	5	10
14	74	67	21	46	33	19	14
15	119	102	32	70	57	29	28
16	41	34	12	22	21	12	9
17	74	49	12	37	27	12	15
20	38	34	9	25	20	9	11
21	42	36	8	28	22	8	14
22	85	65	8	57	32	8	24
23	53	34	7	27	11	7	4
24	8	5	-	5	3	-	3
				Untagged			
September							
6	328	314	152	162	275	150	125
7	116	115	59	56	106	59	47
11	173	167	92	75	145	91	54
12	61	61	42	19	55	42	13
13	86	80	66	14	74	66	8
14	153	152	97	55	129	94	35
Total	1,479	1,338	622	716	1,025	611	414

APPENDIX TABLE 20.--Number post partum and nonpregnant among tagged female seals 4 or more years old and 5 or more years old sampled from the kill, St. George Island, 3, 5, 13-17 and 20-23 August 1962

Date	Daily sample	Daily sample less 2- and 3-year-olds	Ages 4-10+		daily sample less 2-, 3-, and 4-year-olds	Ages 5-10+	
			Post partum	Non-pregnant		Post partum	Non-pregnant
August							
3	2	2	-	2	2	-	2
5	1	1	-	1	-	-	-
13	10	9	2	7	5	1	4
14	24	21	4	17	5	3	2
15	9	8	1	7	7	1	6
16	14	14	2	12	9	2	7
17	11	10	1	9	4	1	3
20	32	24	5	19	12	5	7
12	57	36	7	29	11	7	4
22	27	18	3	15	10	3	7
23	13	8	1	7	1	1	-
Total	200	151	26	125	66	24	42

APPENDIX TABLE 21.--Recovery location of tagged seals killed, by age and rookery, Pribilof Islands, Alaska, 1962

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
N-series - 1-year-old seals, males													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
M-series - 2-year-old seals, males													
ZAP-1	16	3	-	3	3	6	31	5	1	2	-	8	39
TOL	5	8	-	2	1	5	21	1	1	2	1	5	26
L-K	1	1	1	-	-	4	7	1	-	3	-	4	11
REEF	4	5	1	22	3	6	41	3	1	2	2	8	49
POL	1	-	1	-	2	4	8	-	1	1	-	2	10
NEP	2	1	-	2	1	20	26	-	1	2	-	3	29
NOR	2	-	-	2	-	1	5	1	9	1	-	11	16
EAST	-	2	-	-	-	1	3	-	2	1	-	3	6
STAR	-	-	-	-	1	-	1	1	-	-	3	4	5
ZAP-2	3	-	1	-	1	4	9	3	-	1	1	5	14
Tags lost	16	16	6	10	4	21	73	6	6	6	2	20	93
Total	50	36	10	41	16	72	225	21	22	21	9	73	298
L-series - 3-year-old seals, males													
ZAP-1	171	48	4	6	8	38	275	7	7	5	4	23	298
TOL	38	62	4	3	10	25	142	2	4	3	-	9	151
L-K	6	6	14	4	9	34	73	1	2	4	-	7	80
REEF	51	60	11	70	11	47	250	10	5	7	2	24	274
POL	7	13	1	1	64	50	136	2	7	1	4	14	150
NEP	14	12	7	3	26	135	197	1	7	-	4	12	209
NOR	7	-	1	-	3	8	19	4	37	7	1	49	68
EAST	1	3	-	-	5	5	14	1	2	16	3	22	36
STAR	3	2	1	1	2	1	10	-	8	4	6	18	28
ZAP-2	4	3	1	1	3	3	15	11	7	4	-	22	37
Tags lost	158	140	45	46	75	201	665	18	43	41	5	107	772
Total	460	349	89	135	216	547	1,796	57	129	92	29	307	2,103
K-series - 4-year-old seals, males													
ZAP-1	106	29	3	-	9	23	170	2	8	3	-	13	183
TOL	11	31	3	3	7	10	65	-	-	4	-	4	69
L-K	9	12	17	2	18	20	78	-	3	2	1	6	84
REEF	37	36	4	50	6	19	152	-	3	3	-	6	158
POL	1	3	1	1	59	42	107	-	2	2	-	4	111
NEP	12	6	3	4	14	154	193	-	3	-	-	3	196
NOR	3	-	1	-	3	8	15	3	46	2	1	52	67
EAST	-	3	-	-	-	4	7	-	1	27	2	30	37
STAR	2	-	-	-	3	2	7	-	3	3	4	10	17
ZAP-2	1	-	1	-	2	3	7	12	-	1	-	13	20
Tags lost	79	71	19	51	43	157	420	24	23	18	1	66	486
Total	261	191	52	111	164	442	1,221	41	92	65	9	207	1,428
J-series - 5-year-old seals, males													
ZAP-1	2	2	-	-	-	-	4	-	-	1	-	1	5
TOL	-	2	-	-	1	-	3	-	-	1	-	1	4
L-K	-	-	-	-	2	2	4	-	-	-	-	-	4
REEF	3	-	-	3	1	2	9	-	-	-	-	-	9
POL	-	-	-	-	5	-	5	-	-	-	-	-	5
NEP	1	-	-	-	-	13	14	-	-	-	-	-	14
NOR	-	-	-	-	-	-	-	-	2	1	-	3	3
EAST	1	-	-	-	-	-	1	-	1	4	-	5	6
STAR	-	-	-	-	-	-	-	-	-	-	1	1	1
ZAP-2	-	-	-	-	-	-	-	5	-	-	-	5	5
Tags lost	53	27	4	12	13	46	155	10	6	2	4	22	177
Total	60	31	4	15	22	63	195	15	9	9	5	38	233
I-series - 6-year-old seals, males													
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
STAR	-	-	-	-	-	1	1	-	-	-	-	-	1
Total	-	1	-	-	-	1	2	-	-	-	-	-	2

APPENDIX TABLE 21.--Recovery location of tagged seals killed, by age and rookery, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery: St. Paul Island							St. George Island				Grand total
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
M-series - 2-year-old seals, females													
ZAP-1	5	-	-	-	-	-	5	-	1	-	-	1	6
TOL	1	2	-	-	-	1	4	2	-	-	-	2	6
L-K	-	-	-	-	-	-	-	-	-	1	-	1	1
REEF	1	1	-	6	-	-	8	-	-	-	-	-	8
POL	1	1	-	-	-	1	3	-	-	-	-	-	3
NEP	-	1	-	2	-	4	7	-	-	1	-	1	8
NOR	-	-	-	-	-	-	-	-	5	-	-	5	5
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
ZAP-2	2	1	-	-	-	-	3	1	-	-	-	1	4
Tags lost	11	4	-	6	2	10	33	-	2	-	-	2	35
Total	21	10	-	14	2	16	63	3	8	3	-	14	77
L-series - 3-year-old seals, females													
ZAP-1	25	4	-	1	-	3	33	1	-	-	-	1	34
TOL	5	10	-	-	-	-	15	-	-	-	1	1	16
L-K	1	-	-	-	-	1	2	-	-	-	-	-	2
REEF	10	4	-	23	-	-	37	-	1	1	-	2	39
POL	-	-	-	-	4	4	8	-	2	-	-	2	10
NEP	2	1	-	1	-	10	14	-	-	2	-	2	16
NOR	1	-	-	-	-	1	2	-	14	1	1	16	18
EAST	-	1	-	-	1	-	2	-	-	3	-	3	5
STAR	-	-	-	-	-	-	-	-	-	-	3	3	3
ZAP-2	-	-	-	-	-	1	1	5	1	-	-	6	7
Tags lost	73	12	-	31	14	29	159	1	7	4	4	16	175
Total	117	32	-	56	19	49	273	7	25	11	9	52	325
K-series - 4-year-old seals, females													
ZAP-1	47	6	-	-	-	-	53	1	-	-	1	2	55
TOL	5	59	-	-	-	-	64	-	-	1	-	1	65
L-K	1	-	-	-	1	3	5	-	-	-	-	-	5
REEF	16	5	1	39	1	2	64	1	1	-	-	2	66
POL	2	-	-	-	20	9	31	-	1	-	-	1	32
NEP	4	1	-	-	-	61	66	-	-	2	-	2	68
NOR	1	-	-	1	1	4	7	1	44	-	2	47	54
EAST	-	-	-	-	-	-	-	-	1	6	-	7	7
STAR	-	-	-	-	-	1	1	1	1	-	8	10	11
ZAP-2	-	-	-	-	-	-	-	12	-	-	1	13	13
Tags lost	34	60	-	16	25	39	174	15	10	4	5	34	208
Total	110	131	1	56	48	119	465	31	58	13	17	119	584
J-series - 5-year-old seals, females													
ZAP-1	23	6	-	1	-	-	30	-	-	-	-	-	30
TOL	2	33	-	2	-	1	38	-	-	-	1	1	39
L-K	-	-	-	-	2	3	5	1	1	-	-	2	7
REEF	6	6	-	30	2	1	45	-	-	-	1	1	46
POL	-	-	-	-	13	4	17	-	-	1	-	1	18
NEP	2	2	-	-	-	45	49	-	-	-	1	1	50
NOR	1	-	-	-	1	2	4	1	12	2	-	15	19
EAST	-	1	-	-	-	2	3	-	-	7	3	10	13
STAR	-	-	-	-	-	1	1	-	1	-	7	8	9
ZAP-2	2	-	-	-	-	-	2	12	-	-	-	12	14
Tags lost	45	48	-	44	27	80	244	9	6	5	5	25	269
Total	81	96	-	77	45	139	438	23	20	15	18	76	514
I-series - 6-year-old seals, females													
ZAP-1	10	1	-	-	1	-	12	-	-	-	-	-	12
TOL	1	10	-	-	-	-	11	-	-	-	-	-	11
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
REEF	3	2	-	13	1	2	21	-	-	-	-	-	21
POL	-	-	-	-	3	1	4	1	-	-	-	1	5
NEP	-	1	-	-	-	20	21	-	-	1	-	1	22
NOR	1	-	-	-	-	-	1	-	6	-	-	6	7
EAST	-	-	-	-	-	-	-	-	-	2	-	2	2
STAR	-	-	-	-	-	-	-	-	1	-	1	2	2
ZAP-2	1	1	-	-	-	1	3	2	-	-	1	3	6
Tags lost	4	3	-	7	5	14	33	-	2	-	-	2	35
Total	20	18	-	20	10	39	107	3	9	3	2	17	124

APPENDIX TABLE 21.--Recovery location of tagged seals killed, by age and rookery, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
H-series - 7-year-old seals, females													
ZAP-1	22	6	-	-	-	1	29	-	-	-	-	-	29
TOL	3	16	-	-	-	-	19	-	-	-	-	-	19
L-K	-	1	-	1	2	-	4	-	-	-	-	-	4
REEF	8	8	-	32	1	1	50	-	-	-	-	-	50
POL	1	-	-	-	7	6	14	-	-	-	-	-	14
NEP	1	1	-	-	1	40	43	-	-	1	-	1	44
Tags lost	10	10	-	5	4	17	46	-	-	-	-	-	46
Total	45	42	-	38	15	65	205	-	-	1	-	1	206
G-series - 8-year-old seals, females													
ZAP-1	2	1	-	-	1	-	4	-	-	-	-	-	4
TOL	1	3	-	-	-	-	4	-	-	-	-	-	4
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
REEF	-	1	-	6	-	-	7	-	-	-	-	-	7
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	6	6	-	-	-	-	-	6
Tags lost	23	14	-	13	9	35	94	3	-	-	-	3	97
Total	26	19	-	19	12	42	118	3	-	-	-	3	121
F-series - 9-year-old seals, females													
ZAP-1	2	-	-	-	-	-	2	-	-	-	-	-	2
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
REEF	-	-	-	2	-	2	4	-	-	-	-	-	4
POL	1	-	-	-	1	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	3	3	-	-	-	-	-	3
Tags lost	5	3	-	1	2	8	19	-	-	-	-	-	19
Total	8	4	-	3	3	13	31	-	-	-	-	-	31
E-series - 10-year-old seals, females													
ZAP-1	1	1	-	-	-	-	2	-	-	-	-	-	2
REEF	3	3	-	6	1	2	15	-	-	-	-	-	15
POL	-	-	-	-	10	4	14	-	-	-	-	-	14
NEP	-	-	-	-	-	5	5	-	-	-	-	-	5
Tags lost	-	1	-	1	-	3	5	-	-	-	-	-	5
Total	4	5	-	7	11	14	41	-	-	-	-	-	41
11-year-old and older seals, females													
ZAP-1	2	1	-	-	-	-	3	-	-	-	-	-	3
TOL	-	2	-	-	-	-	2	-	-	-	-	-	2
REEF	2	-	-	6	1	-	9	-	-	-	-	-	9
POL	1	1	-	-	14	4	20	-	-	-	-	-	20
NEP	1	2	-	-	-	10	13	-	-	-	-	-	13
Total	6	6	-	6	15	14	47	-	-	-	-	-	47

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962

Rookery of tagging	Rookery of recovery: St. Paul Island ZAP-1	TOL	L-K	REEF	POL	NEP	Total	St. George Island ZAP-2	NOR	EAST	STAR	Total	Grand total
13-17, 20-24 August - 1-year-old seals, males													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
Round 2 - 2-year-old seals, males													
POL	-	-	-	-	-	-	-	-	-	1	-	1	1
EAST	-	1	-	-	-	-	1	-	-	-	-	-	1
Tags lost	-	-	-	-	-	1	1	-	-	-	-	-	1
Total	-	1	-	-	-	1	2	-	-	1	-	1	3
Round 3 - 2-year-old seals, males													
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
L-K	-	-	-	-	-	-	-	-	-	2	-	2	2
Tags lost	2	1	-	-	-	-	3	1	-	1	-	2	5
Total	3	1	-	-	-	-	4	1	-	3	-	4	8
Round 4 - 2-year-old seals, males													
ZAP-1	2	-	-	-	-	-	2	-	-	-	-	-	2
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
NOR	-	-	-	-	-	-	-	-	1	-	-	1	1
ZAP-2	1	-	1	-	-	-	2	-	-	-	-	-	2
Tags lost	3	-	2	2	-	1	8	-	-	-	-	-	8
Total	7	1	3	2	-	2	15	-	1	-	-	1	16
Round 5 - 2-year-old seals, males													
ZAP-1	-	-	-	-	1	-	1	-	-	-	-	-	1
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
REEF	-	-	-	1	-	-	1	-	-	-	-	-	1
NEP	-	-	-	-	1	-	1	-	-	1	-	1	2
STAR	-	-	-	-	1	-	1	-	-	-	-	-	1
ZAP-2	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	1	4	1	-	1	3	10	-	-	-	-	-	10
Total	1	5	1	1	4	5	17	-	-	1	-	1	18
Round 6 - 2-year-old seals, males													
ZAP-1	4	1	-	-	-	2	7	-	-	-	-	-	7
TOL	-	-	-	-	1	2	3	-	-	-	-	-	3
L-K	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	1	-	1	-	1	-	3	-	-	1	-	1	4
POL	-	-	1	-	-	1	2	-	-	-	-	-	2
NEP	1	1	-	-	-	3	5	-	-	-	-	-	5
ZAP-2	2	-	-	-	-	-	2	-	-	-	-	-	2
Tags lost	-	1	2	-	1	4	8	-	-	-	-	-	8
Total	9	3	4	-	3	12	31	-	-	1	-	1	32
Round 7 - 2-year-old seals, males													
ZAP-1	-	-	-	-	-	-	-	-	-	1	-	1	1
TOL	-	-	-	-	-	1	1	-	-	-	-	-	1
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
NEP	1	-	-	-	-	6	7	-	-	-	-	-	7
EAST	-	-	-	-	-	1	1	-	1	-	-	1	2
Tags lost	1	2	1	-	-	2	6	-	3	-	-	3	9
Total	2	2	1	-	-	11	16	-	4	1	-	5	21

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery: St. Paul Island							St. George Island					Grand total
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 8 - 2-year-old seals, males													
ZAP-1	1	2	-	-	-	-	3	1	-	-	-	1	4
TOL	-	2	-	-	-	1	3	-	-	1	-	1	4
L-K	-	-	1	-	-	-	1	-	-	1	-	1	2
REEF	-	1	-	4	-	-	5	-	-	-	-	-	5
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	1	-	1	2
NOR	-	-	-	-	-	-	-	-	1	-	-	1	1
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
STAR	-	-	-	-	-	-	-	-	-	-	1	1	1
Tags lost	-	2	-	2	-	3	7	1	-	3	-	4	11
Total	1	7	1	6	1	5	21	2	1	7	1	11	32
13-17, 20-24 August - 2-year-old seals, males													
ZAP-1	7	-	-	3	2	3	15	4	1	1	-	6	21
TOL	3	5	-	2	-	1	11	1	1	1	1	4	15
L-K	-	1	-	-	-	1	2	1	-	-	-	1	3
REEF	3	3	-	17	2	5	30	3	1	1	2	7	37
POL	1	-	-	-	1	3	5	-	1	-	-	1	6
NEP	-	-	-	2	-	8	10	-	1	-	-	1	11
NOR	2	-	-	2	-	1	5	1	7	1	-	9	14
EAST	-	1	-	-	-	-	1	-	1	-	-	1	2
STAR	-	-	-	-	-	-	-	1	-	-	2	3	3
ZAP-2	-	-	-	-	1	3	4	3	-	1	1	5	9
Tags lost	9	5	-	6	2	7	29	4	3	2	2	11	40
Total	25	15	-	32	8	32	112	18	16	7	8	49	161
6, 7, 11-14, 17-19 September - 2-year-old seals, males													
ZAP-1	2	-	-	-	-	1	3	-	-	-	-	-	3
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
REEF	-	-	-	-	-	1	1	-	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	-	1	-	-	-	-	1	-	-	-	-	-	1
Total	2	1	-	-	-	4	7	-	-	-	-	-	7
Round 2 - 3-year-old seals, males													
ZAP-1	9	10	-	-	-	2	21	1	-	-	-	1	22
TOL	2	3	-	1	-	2	8	-	-	-	-	-	8
L-K	-	-	-	-	-	2	2	-	-	-	-	-	2
REEF	2	4	1	2	3	4	16	3	-	1	-	4	20
POL	2	-	-	-	6	5	13	-	1	1	-	2	15
NEP	-	1	-	1	1	5	8	-	1	-	-	1	9
NOR	-	-	-	-	-	1	1	-	3	-	-	3	4
EAST	-	-	-	-	-	-	-	-	1	-	-	1	1
STAR	1	-	-	-	-	-	1	-	3	-	-	3	4
ZAP-2	2	-	-	-	-	-	2	-	1	-	-	1	3
Tags lost	13	4	-	7	3	11	38	2	5	-	-	7	45
Total	31	22	1	11	13	32	110	6	15	2	-	23	133

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 3 - 3-year-old seals, males													
ZAP-1	23	4	-	-	1	-	28	-	2	1	-	3	31
TOL	4	8	-	-	3	1	16	-	-	-	-	-	16
L-K	-	-	1	-	3	4	8	-	-	-	-	-	8
REEF	8	7	2	2	1	4	24	-	-	-	-	-	24
POL	-	-	-	-	6	2	8	-	-	-	-	-	8
NEP	1	1	-	-	5	17	24	-	-	-	-	-	24
NOR	2	-	-	-	-	-	2	-	1	-	-	1	3
EAST	-	-	-	-	1	1	2	-	-	3	-	3	5
STAR	-	-	-	-	1	-	1	-	-	-	-	-	1
ZAP-2	1	-	-	-	-	-	1	-	1	-	-	1	2
Tags lost	17	15	4	3	15	18	72	2	1	3	-	6	78
Total	56	35	7	5	36	47	186	2	5	7	-	14	200
Round 4 - 3-year-old seals, males													
ZAP-1	38	-	1	-	1	2	42	-	-	-	-	-	42
TOL	14	3	1	-	3	3	24	-	-	-	-	-	24
L-K	2	-	3	-	2	2	9	-	-	2	-	2	11
REEF	15	1	2	5	-	-	23	-	1	1	-	2	25
POL	-	-	-	-	6	4	10	-	-	-	-	-	10
NEP	2	1	3	1	7	18	32	-	2	-	-	2	34
NOR	2	-	1	-	1	1	5	-	2	-	-	2	7
EAST	-	-	-	-	1	-	1	-	-	1	-	1	2
STAR	1	-	-	-	-	-	1	-	-	2	-	2	3
ZAP-2	-	-	-	-	1	1	2	-	-	-	-	-	2
Tags lost	49	4	8	1	9	26	97	-	4	3	-	7	104
Total	123	9	19	7	31	57	246	-	9	9	-	18	264
Round 5 - 3-year-old seals, males													
ZAP-1	19	4	-	-	-	8	31	3	1	-	-	4	35
TOL	5	7	-	-	3	1	16	-	3	1	-	4	20
L-K	-	2	4	-	1	1	8	-	1	-	-	1	9
REEF	6	3	2	9	1	9	30	1	1	-	-	2	32
POL	1	2	-	-	8	5	16	-	2	-	-	2	18
NEP	2	-	1	-	2	17	22	-	-	-	-	-	22
NOR	1	-	-	-	-	3	4	1	8	-	-	9	13
EAST	-	-	-	-	-	-	-	-	-	3	-	3	3
STAR	-	-	-	-	-	-	-	-	1	-	-	1	1
ZAP-2	-	-	-	-	-	2	2	-	-	-	-	-	2
Tags lost	17	27	6	4	10	29	93	4	2	4	-	10	103
Total	51	45	13	13	25	75	222	9	19	8	-	36	258
Round 6 - 3-year-old seals, males													
ZAP-1	46	4	3	1	5	10	69	1	1	2	1	5	74
TOL	11	13	2	-	1	5	32	-	-	2	-	2	34
L-K	1	-	1	1	-	5	8	-	1	2	-	3	11
REEF	18	14	4	12	5	8	61	1	-	3	-	4	65
POL	2	2	1	-	25	7	37	2	1	-	-	3	40
NEP	8	1	2	-	10	33	54	-	-	-	-	-	54
NOR	1	-	-	-	-	1	2	1	6	4	-	11	13
EAST	1	-	-	-	1	-	2	-	1	3	1	5	7
STAR	-	1	-	-	1	1	3	-	1	1	1	3	6
ZAP-2	1	-	1	-	2	-	4	1	2	4	-	7	11
Tags lost	32	21	20	2	29	37	141	2	4	15	1	22	163
Total	121	56	34	16	79	107	413	8	17	36	4	65	478

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 7 - 3-year-old seals, males													
ZAP-1	14	6	-	-	-	5	25	-	1	1	-	2	27
TOL	-	8	1	-	-	7	16	-	-	-	-	-	16
L-K	3	1	3	1	1	16	25	-	-	-	-	-	25
REEF	2	5	-	8	1	16	32	-	2	-	-	2	34
POL	2	3	-	-	7	9	21	-	2	-	-	2	23
NEP	-	2	1	-	-	23	26	-	1	-	-	1	27
NOR	-	-	-	-	2	2	4	-	5	-	-	5	9
EAST	-	-	-	-	1	-	1	-	-	1	-	1	2
STAR	-	-	1	-	-	-	1	-	-	1	-	1	2
ZAP-2	-	-	-	-	-	-	-	1	1	-	-	2	2
Tags lost	13	7	4	6	5	32	67	3	11	5	-	19	86
Total	34	32	10	15	17	110	218	4	23	8	-	35	253
Round 8 - 3-year-old seals, males													
ZAP-1	11	18	-	2	1	11	43	1	1	1	1	4	47
TOL	1	15	-	2	-	6	24	-	1	-	-	1	25
L-K	-	3	2	2	1	4	12	-	-	-	-	-	12
REEF	-	21	-	22	-	2	45	4	1	2	-	7	52
POL	-	6	-	1	6	10	23	-	-	-	3	3	26
NEP	1	6	-	1	1	17	26	1	2	-	1	4	30
NOR	-	-	-	-	-	-	-	1	10	3	1	15	15
EAST	-	3	-	-	1	3	7	1	-	4	-	5	12
STAR	1	-	-	-	-	-	1	-	3	-	3	6	7
ZAP-2	-	3	-	-	-	-	3	3	1	-	-	4	7
Tags lost	8	49	3	18	1	36	115	2	15	9	1	27	142
Total	22	124	5	48	11	89	299	13	34	19	10	76	375
13-17, 20-24 August - 3-year-old seals, males													
ZAP-1	11	2	-	3	-	-	16	1	1	-	2	4	20
TOL	1	5	-	-	-	-	6	2	-	-	-	2	8
L-K	-	-	-	-	1	-	1	1	-	-	-	1	2
REEF	-	5	-	10	-	2	17	1	-	-	2	3	20
POL	-	-	-	-	-	8	8	-	1	-	1	2	10
NEP	-	-	-	-	-	4	4	-	1	-	3	4	8
NOR	1	-	-	-	-	-	1	1	2	-	-	3	4
EAST	-	-	-	-	-	1	1	-	-	1	2	3	4
STAR	-	1	-	1	-	-	2	-	-	-	2	2	4
ZAP-2	-	-	-	1	-	-	1	6	1	-	-	7	8
Tags lost	9	13	-	5	3	12	42	3	1	2	3	9	51
Total	22	26	-	20	4	27	99	15	7	3	15	40	139
6, 7, 11-14, 17-19 September - 3-year-old seals, males													
REEF	-	-	-	-	-	2	2	-	-	-	-	-	2
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Total	-	-	-	-	-	3	3	-	-	-	-	-	3
Round 2 - 4-year-old seals, males													
ZAP-1	15	3	-	-	2	-	20	-	3	-	-	3	23
TOL	-	2	-	1	-	1	4	-	-	-	-	-	4
L-K	1	1	1	1	4	1	9	-	1	-	-	1	10
REEF	5	8	-	4	1	4	22	-	-	-	-	-	22
POL	-	-	-	-	12	1	13	-	1	-	-	1	14
NEP	2	1	-	1	-	19	23	-	-	-	-	-	23
NOR	2	-	-	-	-	2	4	-	9	-	-	9	13
EAST	-	-	-	-	-	2	2	-	-	4	-	4	6
STAR	-	-	-	-	1	2	3	-	-	-	-	-	3
ZAP-2	1	-	1	-	-	-	2	2	-	-	-	2	4
Tags lost	15	3	1	13	6	24	62	3	-	3	-	6	68
Total	41	18	3	20	26	56	164	5	14	7	-	26	190

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery: St. Paul Island							St. George Island					Grand total
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 3 - 4-year-old seals, males													
ZAP-1	17	6	-	-	1	3	27	-	1	-	-	1	28
TOL	-	5	-	-	1	2	8	-	-	-	-	-	8
L-K	2	4	3	-	2	5	16	-	-	1	-	1	17
REEF	5	9	-	5	-	6	25	-	1	-	-	1	26
POL	-	1	-	-	9	11	21	-	-	-	-	-	21
NEP	2	2	-	-	1	25	30	-	-	-	-	-	30
NOR	1	-	-	-	1	2	4	-	5	-	-	5	9
EAST	-	1	-	-	-	1	2	-	-	4	-	4	6
STAR	-	-	-	-	1	-	1	-	-	1	-	1	2
ZAP-2	-	-	-	-	1	2	3	-	-	1	-	1	4
Tags lost	11	6	2	4	11	33	67	1	3	-	-	4	71
Total	38	34	5	9	28	90	204	1	10	7	-	18	222
Round 4 - 4-year-old seals, males													
ZAP-1	19	1	-	-	1	2	23	1	-	-	-	1	24
TOL	6	4	2	-	1	-	13	-	-	-	-	-	13
L-K	2	-	3	-	2	1	8	-	1	-	-	1	9
REEF	7	2	3	6	-	-	18	-	1	1	-	2	20
POL	-	-	-	-	14	13	27	-	-	-	-	-	27
NEP	3	-	-	-	1	12	16	-	-	-	-	-	16
NOR	-	-	-	-	-	1	1	-	14	-	-	14	15
EAST	-	-	-	-	-	1	1	-	1	3	-	4	5
STAR	-	-	-	-	-	-	-	-	1	1	-	2	2
ZAP-2	-	-	-	-	1	-	1	1	-	-	-	1	2
Tags lost	19	2	4	8	9	13	55	2	3	2	-	7	62
Total	56	9	12	14	29	43	163	4	21	7	-	32	195
Round 5 - 4-year-old seals, males													
ZAP-1	19	5	-	-	1	3	28	-	-	1	-	1	29
TOL	1	7	-	1	-	2	11	-	-	-	-	-	11
L-K	1	1	4	1	1	4	12	-	-	-	-	-	12
REEF	7	3	-	7	3	3	23	-	-	-	-	-	23
POL	1	1	-	1	11	3	17	-	-	-	-	-	17
NEP	4	-	-	1	2	27	34	-	2	-	-	2	36
NOR	-	-	-	-	-	1	1	2	10	-	-	12	13
EAST	-	-	-	-	-	-	-	-	-	4	-	4	4
STAR	1	-	-	-	-	-	1	-	2	-	-	2	3
ZAP-2	-	-	-	-	-	1	1	4	-	-	-	4	5
Tags lost	10	22	4	8	5	21	70	5	1	2	-	8	78
Total	44	39	8	19	23	65	198	11	15	7	-	33	231
Round 6 - 4-year-old seals, males													
ZAP-1	10	4	3	-	1	5	23	-	2	1	-	3	26
TOL	2	3	1	-	4	2	12	-	-	-	-	-	12
L-K	1	2	5	-	6	5	19	-	1	1	-	2	21
REEF	7	6	1	9	2	1	26	-	-	1	-	1	27
POL	-	-	1	-	4	4	9	-	-	-	-	-	9
NEP	1	1	2	-	7	25	36	-	1	-	-	1	37
NOR	-	-	-	-	-	-	-	1	1	1	1	4	4
EAST	-	1	-	-	-	-	1	-	-	4	-	4	5
STAR	1	-	-	-	-	-	1	-	-	1	1	2	3
ZAP-2	-	-	-	-	-	-	-	1	-	-	-	1	1
Tags lost	8	13	3	6	8	19	57	1	-	6	1	8	65
Total	30	30	16	15	32	61	184	3	5	15	3	26	210

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 7 - 4-year-old seals, males													
ZAP-1	3	-	-	-	3	5	11	-	-	-	-	-	11
TOL	2	2	-	-	1	3	8	-	-	1	-	1	9
L-K	2	2	1	-	2	2	9	-	-	-	-	-	9
REEF	4	-	-	6	-	2	12	-	-	-	-	-	12
POL	-	-	-	-	6	3	9	-	-	-	-	-	9
NEP	-	-	-	-	3	19	22	-	-	-	-	-	22
NOR	-	-	1	-	1	1	3	-	3	-	-	3	6
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
ZAP-2	-	-	-	-	-	-	-	3	-	-	-	3	3
Tags lost	6	6	5	7	-	24	48	5	2	1	-	8	56
Total	17	10	7	13	16	59	122	8	5	3	-	16	138
Round 8 - 4-year-old seals, males													
ZAP-1	11	8	-	-	-	2	21	1	2	1	-	4	25
TOL	-	5	-	1	-	-	6	-	-	3	-	3	9
L-K	-	2	-	-	-	2	4	-	-	-	-	-	4
REEF	-	5	-	10	-	2	17	-	1	1	-	2	19
POL	-	1	-	-	3	4	8	-	1	2	-	3	11
NEP	-	2	-	1	-	15	18	-	-	-	-	-	18
NOR	-	-	-	-	-	1	1	-	3	1	-	4	5
EAST	-	1	-	-	-	-	1	-	-	6	-	6	7
STAR	-	-	-	-	1	-	1	-	-	-	2	2	3
ZAP-2	-	-	-	-	-	-	-	1	-	-	-	1	1
Tags lost	-	11	-	2	2	20	35	3	12	4	-	19	54
Total	11	35	-	14	6	46	112	5	19	18	2	44	156
13-17, 20-24 August - 4-year-old seals, males													
ZAP-1	11	2	-	-	-	-	13	-	-	-	-	-	13
TOL	-	3	-	-	-	-	3	-	-	-	-	-	3
L-K	-	-	-	-	-	-	-	-	-	-	1	1	1
REEF	2	3	-	3	-	1	9	-	-	-	-	-	9
POL	-	-	-	-	-	1	1	-	-	-	-	-	1
NEP	-	-	1	1	-	12	14	-	-	-	-	-	14
NOR	-	-	-	-	1	-	1	-	1	-	-	1	2
EAST	-	-	-	-	-	-	-	-	-	1	2	3	3
STAR	-	-	-	-	-	-	-	-	-	-	1	1	1
Tags lost	10	7	-	3	2	3	25	4	2	-	-	6	31
Total	23	15	1	7	3	17	66	4	3	1	4	12	78
6, 7, 11-14, 17-19 September - 4-year-old seals, males													
ZAP-1	1	-	-	-	-	3	4	-	-	-	-	-	4
L-K	-	-	-	-	1	-	1	-	-	-	-	-	1
POL	-	-	-	-	1	1	2	-	-	-	-	-	2
Tags lost	-	1	-	-	-	-	1	-	-	-	-	-	1
Total	1	1	-	-	2	4	8	-	-	-	-	-	8
Round 2 - 5-year-old seals, males													
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	-	1
REEF	-	-	-	2	-	-	2	-	-	-	-	-	2
NEP	1	-	-	-	-	2	3	-	-	-	-	-	3
EAST	-	-	-	-	-	-	-	-	1	-	-	1	1
ZAP-2	-	-	-	-	-	-	-	2	-	-	-	2	2
Tags lost	6	2	-	1	-	1	10	-	-	-	-	-	10
Total	7	3	-	3	-	3	16	2	1	-	-	3	19

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962- Continued

Rookery of tagging	Rookery of recovery: St. Paul Island							St. George Island					Grand total
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 3 - 5-year-old seals, males													
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	2	2	-	-	-	-	-	2
NOR	-	-	-	-	-	-	-	-	1	-	-	1	1
Tags lost	4	6	-	-	4	4	18	1	1	-	-	2	20
Total	4	6	-	-	6	7	23	1	2	-	-	3	26
Round 4 - 5-year-old seals, males													
TOL	-	-	-	-	1	-	1	-	-	-	-	-	1
L-K	-	-	-	-	1	-	1	-	-	-	-	-	1
REEF	-	-	-	-	1	-	1	-	-	-	-	-	1
NOR	-	-	-	-	-	-	-	-	1	-	-	1	1
STAR	-	-	-	-	-	-	-	-	-	-	1	1	1
Tags lost	12	1	1	-	6	4	24	2	1	-	-	3	27
Total	12	1	1	-	9	4	27	2	2	-	1	5	32
Round 5 - 5-year-old seals, males													
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	2	2	-	-	-	-	-	2
NOR	-	-	-	-	-	-	-	-	-	1	-	1	1
Tags lost	8	6	-	2	2	7	25	3	-	-	-	3	28
Total	8	7	-	2	2	9	28	3	-	1	-	4	32
Round 6 - 5-year-old seals, males													
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
L-K	-	-	-	-	1	1	2	-	-	-	-	-	2
REEF	2	-	-	-	-	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
ZAP-2	-	-	-	-	-	-	-	1	-	-	-	1	1
Tags lost	10	4	2	4	1	9	30	-	2	-	1	3	33
Total	12	5	2	4	2	11	36	1	2	1	1	5	41
Round 7 - 5-year-old seals, males													
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
REEF	1	-	-	1	-	-	2	-	-	-	-	-	2
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	2	2	-	-	-	-	-	2
Tags lost	9	-	1	1	-	7	18	1	1	1	-	3	21
Total	10	1	1	2	2	9	25	1	1	1	-	3	28
Round 8 - 5-year-old seals, males													
ZAP-1	1	-	-	-	-	-	1	-	-	1	-	1	2
TOL	-	-	-	-	-	-	-	-	-	1	-	1	1
REEF	-	-	-	-	-	2	2	-	-	-	-	-	2
NEP	-	-	-	-	-	3	3	-	-	-	-	-	3
EAST	-	-	-	-	-	-	-	-	-	3	-	3	3
ZAP-2	-	-	-	-	-	-	-	2	-	-	-	-	2
Tags lost	-	7	-	2	-	9	18	3	-	1	1	5	23
Total	1	7	-	2	-	14	24	5	-	6	1	12	36

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery: St. Paul Island							St. George Island					Grand total
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
13-17, 20-24 August - 5-year-old seals, males													
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
EAST	1	-	-	-	-	-	1	-	-	-	-	-	1
Tags lost	4	1	-	2	-	5	12	-	1	-	2	3	15
Total	6	1	-	2	1	6	16	-	1	-	2	3	19
Round 5 - 6-year-old seals, males													
STAR	-	-	-	-	-	1	1	-	-	-	-	-	1
13-17, 20-24 August - 6-year-old seals, males													
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
Round 6 - 2-year-old seals, females													
Tags lost	-	-	-	-	-	1	1	-	-	-	-	-	1
Round 8 - 2-year-old seals, females													
Tags lost	1	-	-	2	-	-	3	-	-	-	-	-	3
13-17, 20-24 August - 2-year-old seals, females													
ZAP-1	4	-	-	-	-	-	4	-	1	-	-	1	5
TOL	1	2	-	-	-	1	4	2	-	-	-	2	6
L-K	-	-	-	-	-	-	-	-	-	1	-	1	1
REEF	1	1	-	5	-	-	7	-	-	-	-	-	7
POL	1	1	-	-	-	1	3	-	-	-	-	-	3
NEP	-	1	-	2	-	4	7	-	-	1	-	1	8
NOR	-	-	-	-	-	-	-	-	5	-	-	5	5
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
ZAP-2	-	1	-	-	-	-	1	1	-	-	-	1	2
Tags lost	9	4	-	4	2	9	28	-	2	-	-	2	30
Total	16	10	-	11	2	15	54	3	8	3	-	14	68
6, 7, 11-14, 17-19 September - 2-year-old seals, females													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	-	-	-	1	-	-	1	-	-	-	-	-	1
ZAP-2	2	-	-	-	-	-	2	-	-	-	-	-	2
Tags lost	1	-	-	-	-	-	1	-	-	-	-	-	1
Total	4	-	-	1	-	-	5	-	-		-	-	5
Round 8 - 3-year-old seals, females													
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
Tags lost	-	1	-	18	-	-	19	-	-	-	-	-	19
Total	-	2	-	18	-	-	20	-	-	-	-	-	20

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
13-17, 20-24 August - 3-year-old seals, females													
ZAP-1	22	4	-	1	-	3	30	1	-	-	-	1	31
TOL	5	10	-	-	-	-	15	-	-	-	1	1	16
L-K	1	-	-	-	-	1	2	-	-	-	-	-	2
REEF	10	3	-	23	-	-	36	-	1	1	-	2	38
POL	-	-	-	-	3	3	6	-	2	-	-	2	8
NEP	2	1	-	1	-	9	13	-	-	2	-	2	15
NOR	1	-	-	-	-	1	2	-	14	1	1	16	18
EAST	-	1	-	-	1	-	2	-	-	3	-	3	5
STAR	-	-	-	-	-	-	-	-	-	-	3	3	3
ZAP-2	-	-	-	-	-	-	-	5	1	-	-	6	6
Tags lost	71	11	-	12	12	28	134	1	7	4	4	16	150
Total	112	30	-	37	16	45	240	7	25	11	9	52	292
6, 7, 11-14, 17-19 September - 3-year-old seals, females													
ZAP-1	3	-	-	-	-	-	3	-	-	-	-	-	3
POL	-	-	-	-	1	1	2	-	-	-	-	-	2
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
ZAP-2	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	2	-	-	1	2	1	6	-	-	-	-	-	6
Total	5	-	-	1	3	4	13	-	-	-	-	-	13
Round 6 - 4-year-old seals, females													
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Round 7 - 4-year-old seals, females													
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	-	-	-	1	-	-	1	-	-	-	-	-	1
Total	-	-	-	1	-	1	2	-	-	-	-	-	2
Round 8 - 4-year-old seals, females													
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	-	1
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
REEF	-	-	1	3	-	-	4	-	-	-	-	-	4
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
NEP	-	1	-	-	-	1	2	-	-	-	-	-	2
NOR	-	-	-	-	-	-	-	-	1	-	-	1	1
Tags lost	1	4	-	3	3	1	12	-	-	-	-	-	12
Total	1	7	1	6	4	2	21	-	1	-	-	1	22
13-17, 20-24 August - 4-year-old seals, females													
ZAP-1	29	5	-	-	-	-	34	1	-	-	1	2	36
TOL	4	58	-	-	-	-	62	-	-	1	-	1	63
L-K	1	-	-	-	-	3	4	-	-	-	-	-	4
REEF	14	5	-	26	1	1	47	1	1	-	-	2	49
POL	2	-	-	-	13	8	23	-	1	-	-	1	24
NEP	3	-	-	-	-	46	49	-	-	2	-	2	51
NOR	1	-	-	1	1	3	6	1	43	-	2	46	52
EAST	-	-	-	-	-	-	-	-	1	6	-	7	7
STAR	-	-	-	-	-	1	1	1	1	-	8	10	11
ZAP-2	-	-	-	-	-	-	-	12	-	-	1	13	13
Tags lost	31	56	-	11	20	38	156	15	10	4	5	34	190
Total	85	124	-	38	35	100	382	31	57	13	17	118	500

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
6, 7, 11-14, 17-19 September -- 4-year-old seals, females													
ZAP-1	18	-	-	-	-	-	18	-	-	-	-	-	18
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
L-K	-	-	-	-	1	-	1	-	-	-	-	-	1
REEF	2	-	-	10	-	1	13	-	-	-	-	-	13
POL	-	-	-	-	6	1	7	-	-	-	-	-	7
NEP	1	-	-	-	-	12	13	-	-	-	-	-	13
NOR	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	2	-	-	1	2	-	5	-	-	-	-	-	5
Total	24	-	-	11	9	15	59	-	-	-	-	-	59
Round 5 - 5-year-old seals, females													
Tags lost	1	-	-	-	-	-	1	-	-	-	-	-	1
Round 6 - 5-year-old seals, females													
Tags lost	1	-	-	-	-	-	1	-	-	-	-	-	1
Round 7 - 5-year-old seals, females													
REEF	-	-	-	-	1	-	1	-	-	-	-	-	1
Round 8 - 5-year-old seals, females													
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	-	1
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
REEF	-	1	-	2	-	-	3	-	-	-	-	-	3
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
NOR	-	-	-	-	-	-	-	-	-	1	-	1	1
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
Tags lost	1	3	-	7	1	2	14	-	-	-	-	-	14
Total	1	6	-	9	2	3	21	-	-	2	-	2	23
13-17, 20-24 August - 5-year-old seals, females													
ZAP-1	12	2	-	1	-	-	15	-	-	-	-	-	15
TOL	1	29	-	2	-	1	33	-	-	-	1	1	34
L-K	-	-	-	-	2	2	4	1	1	-	-	2	6
REEF	4	4	-	15	1	1	25	-	-	-	1	1	26
POL	-	-	-	-	6	3	9	-	-	1	-	1	10
NEP	2	1	-	-	-	15	18	-	-	-	1	1	19
NOR	1	-	-	-	-	-	1	1	12	1	-	14	15
EAST	-	-	-	-	-	2	2	-	-	6	3	9	11
STAR	-	-	-	-	-	1	1	-	1	-	7	8	9
ZAP-2	-	-	-	-	-	-	-	12	-	-	-	12	12
Tags lost	26	41	-	19	15	50	151	9	6	5	5	25	176
Total	46	77	-	37	24	75	259	23	20	13	18	74	333

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
6, 7, 11-14, 17-19 September - 5-year-old seals, females													
ZAP-1	11	3	-	-	-	-	14	-	-	-	-	-	14
TOL	1	3	-	-	-	-	4	-	-	-	-	-	4
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
REEF	2	1	-	13	-	-	16	-	-	-	-	-	16
POL	-	-	-	-	6	1	7	-	-	-	-	-	7
NEP	-	1	-	-	-	29	30	-	-	-	-	-	30
NOR	-	-	-	-	1	2	3	-	-	-	-	-	3
EAST	-	1	-	-	-	-	1	-	-	-	-	-	1
ZAP-2	2	-	-	-	-	-	2	-	-	-	-	-	2
Tags lost	16	4	-	18	11	28	77	-	-	-	-	-	77
Total	32	13	-	31	18	61	155	-	-	-	-	-	155
Round 5 - 6-year-old seals, females													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
Round 6 - 6-year-old seals, females													
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Round 7 - 6-year-old seals, females													
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Round 8 - 6-year-old seals, females													
REEF	-	-	-	2	-	-	2	-	-	-	-	-	2
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
Tags lost	-	-	-	1	-	1	2	-	-	-	-	-	2
Total	-	-	-	3	1	1	5	-	-	-	-	-	5
13-17, 20-24 August - 6-year-old seals, females													
ZAP-1	2	1	-	-	-	-	3	-	-	-	-	-	3
TOL	1	9	-	-	-	-	10	-	-	-	-	-	10
REEF	3	2	-	6	1	-	12	-	-	-	-	-	12
POL	-	-	-	-	1	1	2	1	-	-	-	1	3
NEP	-	1	-	-	-	8	9	-	-	1	-	1	10
NOR	1	-	-	-	-	-	1	-	6	-	-	6	7
EAST	-	-	-	-	-	-	-	-	-	2	-	2	2
STAR	-	-	-	-	-	-	-	-	1	-	1	2	2
ZAP-2	1	-	-	-	-	1	2	2	-	-	1	3	5
Tags lost	1	3	-	3	5	8	20	-	2	-	-	2	22
Total	9	16	-	9	7	18	59	3	9	3	2	17	76
6, 7, 11-14, 17-19 September - 6-year-old seals, females													
ZAP-1	7	-	-	-	1	-	8	-	-	-	-	-	8
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
REEF	-	-	-	5	-	2	7	-	-	-	-	-	7
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	10	10	-	-	-	-	-	10
ZAP-2	-	1	-	-	-	-	1	-	-	-	-	-	1
Tags lost	3	-	-	3	-	5	11	-	-	-	-	-	11
Total	10	2	-	8	2	18	40	-	-	-	-	-	40

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962- Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 8 - 7-year-old seals, females													
ZAP-1	2	-	-	-	-	-	2	-	-	-	-	-	2
TOL	1	1	-	-	-	-	2	-	-	-	-	-	2
REEF	-	1	-	1	-	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	3	3	-	-	-	-	-	3
Tags lost	1	1	-	-	-	-	2	-	-	-	-	-	2
Total	4	3	-	1	-	3	11	-	-	-	-	-	11
13-17, 20-24 August - 7-year-old seals, females													
ZAP-1	8	1	-	-	-	-	9	-	-	-	-	-	9
TOL	1	15	-	-	-	-	16	-	-	-	-	-	16
L-K	-	1	-	-	1	-	2	-	-	-	-	-	2
REEF	5	4	-	5	-	-	14	-	-	-	-	-	14
POL	1	-	-	-	4	5	10	-	-	-	-	-	10
NEP	1	-	-	-	-	19	20	-	-	1	-	1	21
Tags lost	7	6	-	-	1	11	25	-	-	-	-	-	25
Total	23	27	-	5	6	35	96	-	-	1	-	1	97
6, 7, 11-14, 17-19 September - 7-year-old seals, females													
ZAP-1	12	5	-	-	-	1	18	-	-	-	-	-	18
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
L-K	-	-	-	1	1	-	2	-	-	-	-	-	2
REEF	3	3	-	26	1	1	34	-	-	-	-	-	34
POL	-	-	-	-	3	1	4	-	-	-	-	-	4
NEP	-	1	-	-	1	18	20	-	-	-	-	-	20
Tags lost	2	3	-	5	3	6	19	-	-	-	-	-	19
Total	18	12	-	32	9	27	98	-	-	-	-	-	98
Round 6 - 8-year-old seals, females													
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
Round 8 - 8-year-old seals, females													
REEF	-	-	-	1	-	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	1	-	-	1	2	3	7	-	-	-	-	-	7
Total	1	-	-	2	2	4	9	-	-	-	-	-	9
13-17, 20-24 August - 8-year-old seals, females													
ZAP-1	1	1	-	-	-	-	2	-	-	-	-	-	2
TOL	1	3	-	-	-	-	4	-	-	-	-	-	4
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	18	9	-	6	5	24	62	3	-	-	-	3	65
Total	20	13	-	6	5	25	69	3	-	-	-	3	72
6, 7, 11-14, 17-19 September - 8-year-old seals, females													
ZAP-1	1	-	-	-	1	-	2	-	-	-	-	-	2
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
REEF	-	1	-	5	-	-	6	-	-	-	-	-	6
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	4	4	-	-	-	-	-	4
Tags lost	4	5	-	6	2	8	25	-	-	-	-	-	25
Total	5	6	-	11	4	13	39	-	-	-	-	-	39

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 8 - 9-year-old seals, females													
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	-	-	-	1	-	-	1	-	-	-	-	-	1
Total	-	1	-	1	-	1	3	-	-	-	-	-	3
13-17, 20-24 August - 9-year-old seals, females													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	-	-	-	-	-	1	1	-	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	4	3	-	-	-	7	14	-	-	-	-	-	14
Total	5	3	-	-	-	9	17	-	-	-	-	-	17
6, 7, 11-14, 17-19 September - 10-year-old seals, females													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	-	-	-	2	-	1	3	-	-	-	-	-	3
POL	1	-	-	-	1	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	1	-	-	-	2	1	4	-	-	-	-	-	4
Total	3	-	-	2	3	3	11	-	-	-	-	-	11
Round 7 - 10-year-old seals, females													
POL	-	-	-	-	-	1	1	-	-	-	-	-	1
Round 8 - 10-year-old seals, females													
REEF	-	-	-	3	-	-	3	-	-	-	-	-	3
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
Tags lost	-	-	-	1	-	-	1	-	-	-	-	-	1
Total	-	-	-	4	2	-	6	-	-	-	-	-	6
13-17, 20-24 August - 10-year-old seals, females													
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	-	1
REEF	2	-	-	1	-	2	5	-	-	-	-	-	5
POL	-	-	-	-	-	3	3	-	-	-	-	-	3
NEP	-	-	-	-	-	3	3	-	-	-	-	-	3
Tags lost	-	1	-	-	-	3	4	-	-	-	-	-	4
Total	2	2	-	1	-	11	16	-	-	-	-	-	16
6, 7, 11-14, 17-19 September - 10-year-old seals, females													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	1	3	-	2	1	-	7	-	-	-	-	-	7
POL	-	-	-	-	8	-	8	-	-	-	-	-	8
NEP	-	-	-	-	-	2	2	-	-	-	-	-	2
Total	2	3	-	2	9	2	18	-	-	-	-	-	18

APPENDIX TABLE 22.--Recovery location of tagged seals killed, by age, rookery and round, Pribilof Islands, Alaska, 1962--Continued

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	Total	ZAP-2	NOR	EAST	STAR	Total	
Round 7 - 11-year-old and older seals, females													
REEF	1	-	-	-	-	-	1	-	-	-	-	-	1
Round 8 - 11-year-old and older seals, females													
REEF	1	-	-	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	2	1	3	-	-	-	-	-	3
Total	1	-	-	-	2	1	4	-	-	-	-	-	4
13-17, 20-24 August - 11-year-old and older seals, females													
ZAP-1	1	1	-	-	-	-	2	-	-	-	-	-	2
TOL	-	2	-	-	-	-	2	-	-	-	-	-	2
REEF	-	-	-	1	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	5	1	6	-	-	-	-	-	6
NEP	1	-	-	-	-	5	6	-	-	-	-	-	6
Total	2	3	-	1	5	6	17	-	-	-	-	-	17
6, 7, 11-14, 17-19 September - 11-year-old and older seals, females													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	-	-	-	5	1	-	6	-	-	-	-	-	6
POL	1	1	-	-	7	2	11	-	-	-	-	-	11
NEP	-	2	-	-	-	5	7	-	-	-	-	-	7
Total	2	3	-	5	8	7	25	-	-	-	-	-	25

APPENDIX TABLE 23.--Length classes of untagged 3-year-old male seals sampled from the kill, by rookery and round, St. Paul Island, 1962

Rookery of recovery	Length in inches														Total
	≤39	40	41	42	43	44	45	46	47	48	49	50	51	52	
Round number 2															
ZAP	1	2	5	16	13	11	10	3	4	2	-	-	-	-	67
TOL	-	3	-	2	2	2	4	-	-	1	-	-	-	-	14
L-K	-	-	1	1	1	2	-	-	-	-	-	-	-	-	5
REEF	-	1	2	2	8	3	-	1	-	-	-	-	-	-	17
POL	-	1	2	4	3	3	2	1	-	-	-	-	-	-	16
NEP	-	3	3	4	7	7	7	6	1	1	1	1	1	-	42
Total	1	10	13	29	34	28	23	11	5	4	1	1	1	-	161
Round number 3															
ZAP	1	3	4	12	19	18	18	14	4	2	-	-	-	-	94
TOL	-	3	3	9	8	8	12	10	7	3	-	-	-	-	63
L-K	-	1	1	1	1	1	1	2	-	-	1	-	-	-	9
REEF	-	-	1	2	3	1	3	-	1	-	-	-	-	-	11
POL	-	3	-	6	7	9	4	7	3	1	-	-	-	-	40
NEP	-	1	4	11	14	13	7	10	5	1	-	-	-	-	66
Total	1	11	13	41	52	50	44	43	20	7	1	-	-	-	283
Round number 4															
ZAP	2	4	5	26	25	33	23	25	3	3	2	1	-	-	152
TOL	-	-	1	3	2	5	2	1	-	-	-	-	-	-	14
L-K	-	1	1	1	2	5	6	3	-	-	-	-	-	-	19
REEF	1	-	-	1	3	1	2	3	1	2	-	-	-	-	14
POL	1	2	3	6	10	7	11	3	-	-	1	-	-	-	44
NEP	-	2	3	7	9	13	12	8	8	5	1	-	-	-	68
Total	4	9	13	44	51	64	56	43	12	10	4	1	-	-	311
Round number 5															
ZAP	-	1	5	4	19	19	16	19	8	4	6	3	-	-	104
TOL	-	1	1	7	6	9	5	5	7	4	1	-	-	-	46
L-K	-	3	2	1	-	2	3	3	1	-	-	-	-	-	15
REEF	-	1	3	2	2	6	6	2	3	-	1	-	-	-	26
POL	-	-	2	6	4	11	6	12	3	2	-	-	-	-	46
NEP	1	6	18	17	21	20	22	7	2	2	3	-	-	-	119
Total	1	12	31	37	52	67	58	48	24	12	11	3	-	-	356
Round number 6															
ZAP	-	2	3	18	21	35	24	42	12	16	3	1	-	-	177
TOL	-	3	2	5	12	19	18	4	10	5	4	2	-	-	84
L-K	2	-	1	12	10	10	3	5	9	1	1	-	1	-	55
REEF	-	-	-	7	6	4	2	2	5	1	1	-	-	-	28
POL	-	-	4	12	25	18	16	16	5	4	1	-	-	-	101
NEP	1	2	6	18	34	30	15	38	10	5	4	-	1	1	165
Total	3	7	16	72	108	116	78	107	51	32	14	3	2	1	610
Round number 7															
ZAP	-	2	4	3	9	13	10	14	1	3	-	2	1	-	62
TOL	-	-	1	3	3	4	10	6	4	1	1	-	-	-	33
L-K	-	-	-	2	3	8	2	1	1	2	-	-	-	-	19
REEF	-	-	-	2	3	7	4	7	3	5	1	2	-	-	34
POL	-	-	-	1	1	5	7	7	3	3	2	-	-	-	29
NEP	-	-	3	15	16	28	15	29	11	8	3	1	-	-	129
Total	-	2	8	26	35	65	48	64	23	22	7	5	1	-	306
Round number 8															
ZAP	-	-	-	5	9	12	8	11	3	3	-	-	-	-	51
TOL	1	1	8	18	30	65	41	33	14	19	3	2	-	1	236
L-K	-	-	1	1	-	1	-	1	2	-	-	-	-	-	6
REEF	-	4	8	15	16	19	18	21	9	5	1	-	-	-	116
POL	-	-	3	9	5	9	6	2	2	2	2	-	-	-	40
NEP	-	4	6	23	10	27	28	17	9	4	1	1	-	-	130
Total	1	9	26	71	70	133	101	85	39	33	7	3	-	1	579
Grand total	11	60	120	320	402	523	408	401	174	120	45	16	4	2	2,606

APPENDIX TABLE 24.--Length classes of untagged 4-year-old male seals sampled from the kill, by rookery and round, St. Paul Island, 1962

Rookery of recovery	Length in inches																	Total
	≤39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	
Round number 2																		
ZAP	-	-	1	1	2	9	8	9	14	9	2	4	4	-	-	-	-	63
TOL	-	-	-	-	2	-	3	4	2	2	-	-	-	-	-	-	-	13
L-K	-	-	-	2	-	1	-	-	-	-	-	1	-	-	-	-	-	4
REEF	-	-	1	1	1	2	2	6	5	1	2	3	1	-	-	-	-	25
POL	-	-	-	1	1	1	6	3	9	4	2	2	-	-	-	-	-	29
NEP	-	-	-	-	4	5	12	15	9	10	3	4	2	-	1	-	-	65
Total	-	-	2	5	10	18	31	37	39	26	9	14	7	-	1	-	-	199
Round number 3																		
ZAP	1	-	-	-	1	5	4	14	9	5	3	1	1	-	-	-	-	44
TOL	-	-	-	2	1	4	3	7	5	5	6	2	-	1	-	-	-	36
L-K	-	-	-	-	-	1	2	2	-	2	1	-	-	-	-	-	-	8
REEF	-	-	-	-	-	-	2	2	1	2	1	2	1	-	-	-	-	11
POL	-	-	-	3	-	4	4	5	3	6	2	3	-	-	-	-	-	30
NEP	-	-	1	1	5	10	5	20	12	17	15	8	6	1	-	-	-	101
Total	1	-	1	6	7	24	20	50	30	37	28	16	8	2	-	-	-	230
Round number 4																		
ZAP	-	-	2	4	5	9	4	19	8	18	10	3	2	-	1	-	-	85
TOL	-	-	-	-	1	-	-	1	3	2	-	-	-	-	-	-	-	7
L-K	-	-	-	-	1	1	3	1	3	2	1	1	2	-	-	-	-	15
REEF	-	-	-	-	1	2	2	2	4	2	4	1	1	-	-	-	-	19
POL	-	-	-	-	-	1	7	7	5	6	5	2	1	-	-	-	-	34
NEP	-	-	-	2	3	6	9	7	11	17	3	4	2	-	-	-	-	64
Total	-	-	2	6	11	19	25	37	34	47	23	11	8	-	1	-	-	224
Round number 5																		
ZAP	-	-	-	6	2	5	6	10	3	2	4	-	2	-	-	-	1	41
TOL	-	-	-	1	2	4	4	4	5	2	3	1	-	-	-	-	-	26
L-K	-	-	-	-	-	1	2	2	4	1	2	1	-	-	-	-	-	13
REEF	-	-	-	1	-	1	3	2	3	5	4	1	1	-	-	-	-	21
POL	-	-	-	-	1	-	-	10	3	5	1	2	1	-	-	-	-	23
NEP	-	1	-	2	5	6	9	17	17	16	5	1	1	-	-	-	-	80
Total	-	1	-	9	9	15	24	45	34	34	18	8	6	-	-	-	1	204
Round number 6																		
ZAP	-	-	-	-	4	3	2	15	6	11	5	7	3	2	-	1	-	59
TOL	-	-	1	1	6	3	3	2	8	3	2	1	-	1	-	-	-	31
L-K	-	-	-	1	2	1	1	2	1	2	1	-	3	1	-	-	-	15
REEF	-	-	2	-	1	1	-	-	1	2	4	3	1	-	-	-	-	15
POL	-	1	-	1	-	2	1	4	5	10	6	2	3	-	-	-	-	35
NEP	-	-	-	1	1	6	6	12	10	10	5	7	2	-	-	1	-	61
Total	-	1	3	4	14	16	13	35	31	38	23	20	12	4	-	2	-	216
Round number 7																		
ZAP	-	-	-	-	-	1	2	3	2	1	2	1	2	2	-	-	-	16
TOL	-	-	-	-	-	-	-	1	4	1	2	4	2	-	-	-	-	14
L-K	-	-	-	-	1	1	1	-	-	-	1	-	-	-	-	-	-	4
REEF	-	-	-	-	-	1	1	3	1	5	3	4	3	-	-	-	-	21
POL	-	-	-	-	-	1	3	4	3	5	1	-	-	-	-	-	-	17
NEP	-	-	-	1	2	2	6	12	10	13	6	2	1	-	-	-	-	55
Total	-	-	-	1	3	6	13	23	20	25	15	11	8	2	-	-	-	127
Round number 8																		
ZAP	-	-	-	1	-	-	1	2	1	5	5	3	3	1	-	-	-	22
TOL	-	-	-	-	2	2	5	7	9	8	5	3	2	-	1	-	-	44
L-K	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	3
REEF	-	-	-	-	-	2	3	11	2	2	2	2	-	1	-	-	-	25
POL	-	-	-	-	1	1	1	1	1	2	2	1	-	-	-	-	-	10
NEP	-	-	-	5	4	5	5	14	9	10	5	3	1	-	-	-	-	61
Total	-	-	-	6	7	10	15	35	24	27	20	12	6	2	1	-	-	165
Grand total	1	2	8	37	61	108	141	262	212	234	136	92	55	10	3	2	1	1,365

APPENDIX TABLE 25.--Summary of length classes of untagged 3- and 4-year-old male seals sampled from the kill, by rookery, St. Paul Island, 1962

Length in inches	Rookery of recovery						Total
	ZAP	TOL	L-K	REEF	POL	NEP	
				Age 3			
≤39	4	1	2	1	1	2	11
40	14	11	5	6	6	18	60
41	26	16	7	14	14	43	120
42	84	47	19	31	44	95	320
43	115	63	17	41	55	111	402
44	141	112	29	41	62	138	523
45	108	92	15	35	52	106	408
46	128	59	15	36	48	115	401
47	35	42	13	22	16	46	174
48	33	33	3	13	12	26	120
49	11	9	2	4	6	13	45
50	7	4	--	2	--	3	16
51	1	--	1	--	--	2	4
52	--	1	--	--	--	1	2
Total	707	490	128	246	316	719	2,606
				Age 4			
≤39	1	--	--	--	--	--	1
40	--	--	--	--	1	1	2
41	3	1	--	3	--	1	8
42	12	3	3	2	5	12	37
43	14	13	4	3	3	24	61
44	32	11	6	9	10	40	108
45	27	18	9	13	22	52	141
46	72	26	7	26	34	97	262
47	43	35	10	17	29	78	212
48	51	26	7	19	38	93	234
49	31	17	7	20	19	42	136
50	19	13	3	16	12	29	92
51	17	5	5	8	5	15	55
52	5	2	1	1	--	1	10
53	1	1	--	--	--	1	3
54	1	--	--	--	--	1	2
55	1	--	--	--	--	--	1
Total	330	171	62	137	178	487	1,365

APPENDIX TABLE 26.--Tag numbers (0-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 2 and 3 September 1962

Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight
	Kg		Kg		Kg		Kg		Kg		Kg		Kg		Kg
POLOVINA - males															
20245	6.8	27780	6.8	28110	9.0	28686	9.4	30203	9.8	31216	9.0	31292	8.8	31464	9.0
27702	7.6	27790	7.4	28149	8.2	28692	9.2	30219	8.8	31218	10.2	31311	5.4	31480	6.6
27703	8.8	27795	6.0	28176	7.2	28723	6.4	30227	9.2	31220	7.8	31318	7.0	31494	10.6
27711	7.4	27799	8.0	28253	4.2	28767	7.2	30241	8.6	31222	7.0	31319	9.4	31514	6.2
27726	12.2	27803	6.0	28284	8.4	28887	9.4	30269	9.2	31230	7.8	31361	8.6	31534	5.2
27740	9.0	27869	6.8	28338	8.4	28942	9.6	30270	7.2	31237	7.6	31371	9.2	31542	6.2
27741	8.8	27889	9.6	28403	10.2	28950	7.8	30284	9.6	31241	8.6	31385	8.0	31658	6.0
27752	7.4	27925	8.6	28433	8.8	28977	6.2	30476	9.1	31267	6.0	31410	9.4	31747	10.0
27754	7.6	28057	5.8	28436	9.2	29186	7.0	31066	8.8	31272	10.6	31421	10.4	31751	9.0
27779	9.6	28098	5.4	28475	6.2										
POLOVINA - females															
27722	7.4	28299	9.0	28535	7.2	30109	9.4	30333	9.2	31089	6.4	31322	5.4	31460	7.8
27731	6.8	28311	6.8	28690	9.6	30213	8.0	30464	5.0	31111	8.0	31324	6.2	31465	5.4
27732	3.6	28402	9.4	28704	9.4	30232	7.8	30484	6.0	31145	5.2	31344	10.4	31469	9.2
27755	9.2	28410	6.6	28708	7.2	30257	7.6	30494	7.8	31209	11.0	31380	8.8	31476	7.8
27783	8.0	28414	6.8	28735	5.0	30258	5.4	30500	7.8	31242	6.4	31384	7.2	31493	9.6
27919	7.8	28427	7.4	28906	9.2	30262	8.2	30604	6.0	31244	6.2	31405	7.2	31504	5.2
27953	6.6	28431	9.0	28913	7.8	30267	8.4	31006	8.0	31268	10.0	31408	6.0	31516	5.2
28027	5.6	28452	7.8	28919	8.2	30271	8.6	31034	6.0	31271	9.8	31427	8.8	31595	6.2
28087	7.2	28458	7.6	28933	8.0	30296	8.8	31041	5.8	31282	7.0	31456	7.2	31651	7.4
28260	7.6	28500	7.0	28976	6.0										
ZAPADNI - males															
13973	8.0	14561	8.0	14902	8.8	15187	8.6	15553	6.2	16461	6.4	17048	9.0	17354	7.8
14326	8.2	14581	6.2	14948	6.4	15217	7.0	15582	9.8	16562	10.4	17068	8.2	17450	9.8
14374	7.0	14603	10.8	14950	8.0	15264	5.8	15841	8.4	16594	7.8	17122	8.2	17452	7.8
14391	6.6	14622	10.4	15012	5.8	15332	7.2	15914	5.8	16606	7.0	17125	8.2	17461	7.6
14401	9.0	14643	6.4	15033	6.4	15335	8.0	15979	9.6	16707	10.2	17160	7.2	17501	15.4
14413	4.6	14670	10.0	15043	10.8	15343	7.8	16279	9.4	16726	9.6	17197	11.0	17615	6.8
14440	7.0	14690	9.6	15045	9.0	15354	8.6	16281	8.8	16827	6.4	17228	8.6	17696	6.6
14456	8.0	14723	6.8	15105	9.2	15399	9.4	16331	6.4	16873	5.0	17270	6.8	17776	10.6
14473	5.4	14791	8.2	15123	11.4	15539	10.0	16360	7.0	17046	8.4	17326	8.4	17886	8.0
14546	8.2	14839	9.8	15140	8.0										
ZAPADNI - females															
14312	5.2	14795	5.2	15238	8.0	15556	9.2	16092	6.2	16481	9.2	16991	9.2	17510	7.2
14327	5.4	14999	10.4	15249	9.2	15610	8.6	16280	5.4	16595	8.6	16996	8.6	17513	8.2
14335	6.2	15001	7.6	15257	6.8	15677	8.8	16340	5.0	16600	5.6	16999	9.2	17527	7.2
14343	6.4	15093	5.6	15266	7.0	15709	6.8	16366	9.4	16616	6.0	17178	7.6	17616	4.6
14410	5.6	15166	6.4	15267	5.4	15721	5.2	16398	8.8	16667	6.2	17256	7.0	17651	5.0
14420	8.6	15171	8.2	15329	9.4	15793	7.6	16437	6.8	16751	6.4	17261	7.2	17658	5.6
14461	7.4	15173	6.8	15351	5.2	15809	7.8	16444	7.6	16754	7.0	17358	8.4	17691	7.4
14585	7.2	15174	7.0	15362	6.2	15893	6.2	16448	7.8	16782	6.4	17420	10.8	17698	5.0
14688	5.4	15205	7.4	15429	5.4	15896	10.0	16472	10.2	16915	5.4	17470	7.4	17759	5.0
14725	5.8	15228	6.6												
REEF - males															
18437	8.6	23056	8.0	23298	6.2	23374	9.4	23882	6.8	23964	8.0	24216	8.2	26848	11.2
18575	10.0	23103	7.0	23304	7.6	23807	8.4	23906	10.0	23975	7.6	24390	10.4	26874	10.2
18581	10.0	23108	12.6	23309	6.4	23828	7.0	23910	11.6	23981	9.4	24460	9.6	26895	10.0
18587	11.2	23127	7.6	23318	10.2	23841	7.6	23921	6.0	23983	10.6	24663	7.0	26904	6.8
18596	10.2	23165	6.4	23320	8.6	23846	7.4	23922	8.4	24046	8.4	24718	9.0	26977	9.8
18605	8.4	23167	12.8	23322	10.4	23848	8.0	23938	6.6	24069	5.8	24901	8.8	26992	9.6
18608	7.8	23212	6.2	23337	9.8	23857	9.6	23948	8.2	24164	7.6	26512	6.4	27067	7.0
18630	6.2	23234	8.4	23339	7.0	23874	12.0	23951	7.4	24166	10.8	26605	9.2	27099	8.0
18645	9.4	23282	6.8	23359	8.6	23879	7.8	23963	10.6	24184	6.6	26689	8.8		
REEF - females															
18418	9.6	18570	6.2	18634	5.8	23130	8.4	23287	7.8	23867	6.0	24119	4.2	26692	7.8
18501	9.0	18571	10.2	18640	8.8	23141	8.6	23294	7.2	23873	7.4	24201	10.8	26811	7.2
18503	10.6	18576	6.8	18753	7.8	23173	5.4	23299	8.6	23875	7.8	24256	9.8	26822	6.4
18519	9.2	18578	6.8	18819	7.4	23174	7.2	23303	6.4	23896	8.2	24257	7.2	26833	8.6
18520	8.6	18582	7.4	22007	6.6	23180	6.0	23332	8.4	23902	9.2	24377	8.6	26834	7.6
18527	9.8	18589	6.2	22244	7.6	23202	9.0	23348	6.8	23929	8.0	24454	8.4	26864	7.2
18529	7.8	18592	7.6	23110	5.4	23214	6.2	23357	7.8	23977	6.2	26528	8.2	27040	6.4
18530	4.8	18599	6.4	23111	7.0	23215	6.8	23372	7.4	23997	9.8	26589	7.4	27063	9.2
18548	6.4	18607	9.2	23115	4.2	23235	4.8	23851	7.8	24074	4.6	26666	9.2	27066	8.2
18569	7.2	18627	6.4	23121	7.8										
NORTHEAST POINT - males															
33505	7.0	33802	7.6	38160	8.2	38424	7.0	40614	12.0	40865	10.2	41124	12.0	41247	7.2
33589	9.2	33821	6.0	38202	10.4	38471	8.0	40655	5.6	40890	6.2	41140	10.2	41269	9.4
33591	5.0	33850	12.4	38205	9.8	38474	10.4	40794	6.0	40953	10.4	41141	6.2	41269	9.2
33659	12.0	33892	6.0	38248	10.2	38493	10.2	40801	10.8	41035	6.6	41178	9.4	41296	6.8
33704	9.2	37338	6.4	38256	7.8	38831	11.2	40807	11.2	41061	9.8	41187	8.2	42308	10.8
33720	6.4	37361	8.2	38282	14.4	38869	6.6	40816	8.2	41075	10.2	41220	9.0	42408	9.8
33766	10.0	37374	9.6	38314	10.2	38980	7.2	40829	9.8	41078	6.4	41221	8.8	42425	8.4
33787	6.4	37390	7.6	38321	8.8	40548	10.0	40834	6.4	41114	9.2	41246	10.2	42450	6.0
33792	10.4	38123	10.4	38342	10.0	40613	8.6	40838	9.8						
NORTHEAST POINT - females															
33579	5.4	33719	8.2	37370	9.0	38199	5.0	38347	6.6	38500	7.8	40948	6.8	41156	8.0
33606	6.4	33753	9.6	37383	7.2	38229	8.8	38358	10.0	40654	9.0	40952	7.2	41195	10.2
33612	10.0	33786	7.4	38008	8.6	38254	8.8	38375	9.4	40657	9.0	40974	9.0	41245	7.2
33629	6.6	33809	12.0	38031	9.6	38274	7.6	38388	7.2	40673	8.0	40982	10.2	41252	7.8
33638	7.6	33817	9.4	38093	8.2	38285	9.2	38456	7.4	40676	9.0	40986	6.0	41276	9.4
33676	7.4	33836	7.2	38122	9.6	38303	6.4	38458	11.2	40698	9.6	41024	9.0	42411	7.4
33689	6.8	33841	6.4	38165	9.8	38304	8.6	38479	7.8	40875	10.2	41106	7.6	42464	5.0
33708	9.2	33851	7.4	38174	9.0	38339	6.2	38490	8.6	40934	7.4	41127	8.2	42485	9.2
33715	12.0	33875	6.2	38187	6.4	38346	8.4	38491	9.6						

APPENDIX TABLE 27.--Tag numbers (0-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 2 and 3 October 1962

Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight
	Kg		Kg		Kg		Kg		Kg		Kg		Kg		Kg
POLOVINA - males															
28180	13.6	31834	14.8	31980	14.4	32046	12.8	32181	10.6	32423	11.8	32685	13.6	32905	13.6
28186	12.6	31842	9.8	31990	10.2	32052	8.8	32199	10.4	32444	12.4	32694	11.8	32914	13.2
28189	8.2	31902	10.0	32005	9.0	32059	9.8	32226	12.0	32460	9.4	32741	11.0	32959	11.4
28566	11.8	31905	10.6	32015	11.8	32078	13.2	32281	8.2	32491	9.2	32760	10.2	32965	9.8
28608	8.8	31930	12.8	32019	12.8	32089	8.4	32344	10.6	32519	10.0	32806	7.2	32994	10.8
28861	9.4	31947	10.8	32020	10.2	32098	12.2	32386	15.2	32572	19.0	32855	9.2	33018	12.6
28886	13.2	31948	10.6	32031	13.0	32099	10.6	32406	10.4	32600	10.6	32869	11.2	33070	7.4
31024	6.8	31950	10.2	32035	11.2	32161	10.6	32417	10.4	32628	9.4	32880	13.4	39119	8.6
31663	15.2	31964	10.4	32043	8.2	32177	9.4	32421	11.0	32644	6.6	32885	7.0	39946	9.6
31818	18.4	31971	12.2												
POLOVINA - females															
15991	7.4	31807	11.2	31956	7.4	32038	10.6	32092	6.0	32281	7.4	32537	8.0	32850	12.0
27886	6.0	31808	8.2	31960	9.0	32048	6.2	32094	13.8	32384	9.0	32571	9.6	32934	10.6
27953	7.8	31813	10.2	31968	7.2	32050	9.8	32120	9.8	32409	9.4	32586	8.0	32936	5.8
28071	10.6	31817	5.8	31970	6.8	32051	7.8	32124	10.2	32418	12.4	32607	11.4	32941	12.2
28080	8.0	31819	8.2	31978	13.4	32062	12.4	32140	9.4	32438	11.6	32649	8.4	32944	8.2
28134	7.6	31835	9.2	31986	12.6	32064	13.8	32160	12.0	32477	12.2	32733	11.0	32971	10.6
28542	9.6	31837	7.2	31987	10.2	32066	10.2	32175	12.8	32492	9.8	32784	12.2	32981	8.4
30853	10.8	31848	15.0	31998	11.4	32079	10.2	32178	7.2	32498	12.4	32808	7.8	33026	9.6
31098	14.6	31944	11.0	32009	10.0	32085	8.2	32253	10.2	32506	9.2	32813	7.2	33056	8.4
31116	5.0	31952	11.4	32018	9.4										
ZAPADNI - males															
11657	15.4	14710	16.0	14843	13.8	15138	8.4	15493	12.8	16189	10.2	16710	12.2	17318	15.4
14336	12.4	14714	10.6	14868	11.2	15179	9.2	15573	20.4	16311	12.8	16774	12.4	17327	11.6
14418	11.4	14732	10.6	14934	13.6	15227	12.2	15576	12.2	16407	14.4	16787	12.4	17341	13.6
14434	11.2	14738	11.2	14974	13.8	15262	14.0	15722	12.4	16491	13.0	16815	13.0	17453	12.6
14514	14.6	14743	12.4	14982	9.2	15297	12.8	15744	9.0	16495	12.6	17025	5.2	17470	11.0
14564	10.4	14757	14.0	14989	9.2	15332	5.6	15778	12.8	16555	11.2	17125	8.8	17668	8.8
14609	11.4	14799	10.4	15030	13.2	15342	9.6	15805	7.4	16562	15.8	17176	12.8	17695	7.8
14611	12.0	14821	10.8	15075	14.0	15381	15.2	15806	7.8	16566	13.6	17188	12.6	17699	13.8
14663	12.2	14823	11.4	15098	13.2	15386	8.6	15818	13.6	16582	14.2	17298	18.6	17718	8.0
14668	7.2	14830	11.0	15125	10.0										
ZAPADNI-females															
14153	11.2	14551	11.0	15025	10.4	15349	9.2	16347	9.6	16790	11.6	16985	14.0	17384	11.0
14326	8.4	14689	10.4	15033	9.8	15480	8.6	16389	7.8	16792	8.8	16952	12.2	17414	11.4
14339	7.6	14775	9.0	15099	12.6	15501	7.6	16394	11.2	16847	13.2	17023	10.6	17429	11.2
14348	14.8	14786	12.2	15102	13.2	15524	13.2	16409	12.6	16857	10.6	17030	17.0	17464	11.2
14500	14.2	14793	11.4	15108	11.8	15556	11.6	16434	6.0	16881	12.8	17050	11.0	17640	7.2
14520	11.2	14795	8.8	15112	10.8	15769	11.2	16576	10.4	16891	10.2	17120	11.6	17693	9.4
14601	9.4	14841	5.2	15123	10.2	15866	10.0	16660	8.0	16901	12.2	17137	6.8	17711	11.2
14608	9.6	14878	7.0	15198	11.8	15958	9.8	16747	10.8	16924	14.4	17180	13.0	17727	8.8
14620	12.2	14978	11.4	15220	9.4	16179	10.6	16768	12.4	16964	13.2	17215	12.0	17757	8.8
14635	6.0	14996	6.2	15226	8.4										
REEF - males															
18085	11.6	20612	14.8	23871	9.8	24148	9.4	24264	9.2	24445	9.2	24984	8.8	26842	6.2
18223	8.6	20799	9.8	23888	10.4	24149	10.6	24283	10.8	24470	9.6	26167	10.2	26867	9.4
18333	10.8	20960	5.8	23938	8.6	24184	10.6	24329	15.0	24651	10.0	26518	9.2	26904	7.2
18630	9.0	20962	10.2	23970	9.4	24192	12.6	24340	14.6	24658	10.4	26524	9.6	26982	8.8
19852	11.2	23132	10.6	23985	12.2	24211	12.0	24385	14.6	24669	9.0	26539	14.4	27670	7.2
19854	9.8	23290	15.2	24042	11.4	24229	13.4	24393	18.0	24848	13.0	26614	11.2	34323	9.6
19932	8.4	23841	9.0	24082	11.2	24238	11.4	24410	7.2	24893	12.6	26652	8.2	36641	9.8
19999	8.8	23848	7.6	24086	11.0	24243	13.0	24413	7.6	24958	13.6	26672	7.2	48319	8.6
20604	7.6	23853	14.6	24129	10.6	24260	6.6	24422	12.0	24969	10.4				
REEF - females															
18020	10.0	20662	11.4	23334	11.0	24001	8.2	24241	9.6	24797	10.2	26612	10.8	26878	8.6
18402	11.2	20693	9.8	23340	10.6	24014	8.0	24288	12.2	24832	10.8	26653	10.4	26963	10.8
18627	8.6	22011	8.2	23380	6.2	24025	11.4	24300	9.8	24845	7.6	26663	9.3	26978	12.2
18638	7.8	22624	7.2	23824	9.4	24047	12.0	24321	7.4	24931	8.8	26697	11.2	27029	9.2
18776	9.8	22628	8.8	23901	11.0	24077	7.4	24354	9.6	24965	6.0	26804	10.6	27090	12.0
18848	10.0	23132	8.2	23918	7.8	24088	13.0	24396	10.8	25442	10.8	26805	11.2	27092	11.8
19664	8.4	23165	7.2	23948	10.0	24137	8.4	24500	7.4	25968	9.0	26810	12.2	28529	10.6
20012	10.0	23187	9.2	23972	8.0	24142	6.8	24569	10.2	26364	11.2	26827	8.8	32216	12.4
20036	9.2	23325	9.8	23997	9.4	24209	8.6	24684	11.8	26513	10.8	26841	15.0		
NORTHEAST POINT - males															
23626	12.4	33712	11.2	34376	12.2	38181	10.6	38984	13.6	39491	12.2	40679	14.2	41159	13.4
23700	9.6	33807	14.8	35297	12.0	38184	11.4	38988	11.2	39546	7.6	40721	12.8	41190	14.4
33509	11.4	33829	9.8	37393	10.2	38267	12.6	39118	8.6	39551	10.0	40774	10.0	41221	9.2
33583	13.8	33835	7.0	38058	12.0	38305	11.2	39130	16.8	39552	10.0	40826	9.4	41226	13.4
33589	11.8	33882	15.6	38094	11.0	38334	11.8	39171	8.4	39559	13.2	40943	7.8	41249	16.4
33662	7.0	34337	10.2	38099	9.8	38337	15.6	39235	11.2	39696	8.8	40969	9.0	42387	11.0
33686	9.4	34347	13.2	38108	11.8	38361	10.2	39268	14.6	39970	15.0	40993	12.0	42420	12.8
33687	13.6	34354	13.8	38116	13.2	38392	14.4	39273	8.6	40614	15.2	41134	12.4	42429	10.4
33693	11.4	34362	7.2	38167	8.6	38468	8.0	39308	7.2	40661	13.4	41150	11.8	42475	12.0
33700	9.8	34374	9.8												
NORTHEAST POINT - females															
33078	8.8	34329	9.8	37377	7.8	38223	9.8	38488	8.6	39608	8.8	40888	9.0	41254	5.8
33369	12.4	34345	6.0	37396	8.4	38224	4.8	38494	9.8	39695	11.2	40892	8.4	41277	8.8
33503	10.6	34346	12.2	38005	5.4	38228	10.4	38941	8.2	40623	10.2	40924	7.2	41291	8.8
33605	10.2	34350	6.8	38045	11.4	38233	8.2	39136	10.8	40660	12.4	41052	13.2	41295	11.8
33761	10.2	34372	8.8	38050	10.2	38285	12.2	39295	11.0	40671	10.8	41065	9.0	42407	13.8
33772	15.0	35300	8.4	38140	12.8	38339	10.0	39299	7.2	40687	7.2	41088	9.4	42460	8.6
33798	9.8	37267	8.0	38185	12.0	38341	8.0	39360	17.2	40761	10.6	41106	11.2	42492	11.0
33830	12.4	37327	9.2	38186	8.6	38408	8.0	39542	11.6	40772	9.4	41121	11.0	48408	12.4
33857	13.8	37358	11.0	38208	11.4	38427	8.8	39552	10.8	40845	11.2	41197	13.6	49505	9.6
34310	9.6	37363	10.6	38210	12.8										

APPENDIX TABLE 28.--Tag numbers (0-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 24 and 25 October 1962

Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight
			Polovina - males				
	Kg.		Kg.		Kg.		Kg.
27832	11.0	28989	15.4	32194	13.8	32820	11.8
27833	14.0	29124	11.6	32195	11.0	32832	9.6
27938	10.6	29137	11.6	32197	13.8	32839	12.8
27949	10.4	30051	11.2	32412	11.8	32840	8.6
28103	11.2	30054	8.2	32416	11.8	32849	10.6
28275	12.8	30057	10.2	32498	12.6	32850	10.8
28283	16.4	31042	13.2	32557	11.0	32850	10.8
28359	11.8	31142	13.0	32602	10.6	32855	8.4
28538	11.4	31558	12.0	32628	7.2	32894	5.6
28543	11.4	31586	17.6	32657	10.8	32898	15.2
28545	12.8	31703	11.4	32664	11.2	32958	15.2
28565	9.2	31737	17.8	32679	13.8	32971	9.6
28608	9.4	31932	11.6	32686	9.8	33085	10.8
28638	15.6	31964	14.0	32692	10.6	36089	16.0
28692	10.4	32017	8.4	32723	11.6	36962	12.4
28695	16.8	32021	12.0	32741	10.2		
28821	9.6	32046	11.4	32765	12.0		
28868	14.6	32087	11.2	32776	15.0		
28887	12.2	32103	9.8	32810	11.8		
28987	11.4	32183	9.2	32814	10.8		
			Polovina - females				
28817	13.4	28701	11.0	31688	13.2	32653	9.8
27877	11.2	28703	11.6	31725	15.8	32654	11.4
27941	12.2	28720	10.6	31757	12.6	32655	10.8
28031	13.4	28738	11.6	31816	10.4	32669	9.6
28081	13.8	28746	12.2	31819	8.4	32712	13.2
28084	12.6	28772	10.8	31849	9.2	32716	14.4
28126	8.8	28776	10.4	31939	11.2	32733	10.8
28168	11.6	28778	8.2	31988	9.4	32763	12.6
28172	13.8	28798	9.6	31996	10.4	32783	11.2
28207	11.4	28954	9.0	32011	9.8	32784	9.8
28262	12.8	30767	7.0	32145	12.8	32793	8.2
28270	10.2	31004	12.6	32163	11.4	32805	8.2
28290	10.8	31064	13.2	32388	15.0	32808	7.4
28334	8.4	31168	9.4	32424	11.2	32896	9.6
28532	7.4	31197	8.6	32486	10.8	32899	12.8
28550	12.4	31550	11.6	32574	10.0	32941	12.2
28557	11.6	31568	10.2	32615	8.6	35090	12.6
28591	11.6	31580	11.2	32616	11.2	40236	10.4
28648	4.4	31673	10.8	32643	10.0		

APPENDIX TABLE 28.--Tag numbers (O-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 24 and 25 October 1962--Continued

Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight
			Zapadni - males				
	Kg.		Kg.		Kg.		Kg.
14316	17.2	15036	12.4	16315	13.4	17153	19.6
14410	6.2	15072	14.2	16367	15.8	17197	12.8
14413	5.8	15289	14.6	16390	11.4	17247	7.8
14422	10.8	15295	7.4	16391	6.6	17304	9.4
14440	8.0	15353	9.6	16414	18.4	17329	14.6
14448	15.6	15368	11.4	16496	8.4	17354	10.6
14455	7.6	15481	7.2	16609	19.0	17363	9.0
14581	11.4	15525	19.4	16620	14.8	17393	13.0
14470	8.0	15570	17.2	16652	16.4	17403	13.6
14723	14.8	15593	11.8	16654	6.6	17448	11.0
14817	10.6	15595	15.0	16694	16.2	17494	6.4
14861	9.2	15617	14.4	16681	10.4	17497	16.0
14878	11.6	15704	14.8	16827	12.6	17570	16.6
14914	13.4	15722	10.8	16917	9.8	17649	13.2
14932	7.4	15744	14.8	16928	16.6	17685	11.6
14938	14.2	15907	13.6	16950	11.4	17688	14.2
14980	7.0	15947	17.0	17030	18.2	17720	11.8
15008	15.6	15948	13.6	17084	17.2	17753	17.0
15012	7.8	16139	13.0	17098	11.8		
			Zapadni - females				
14171	15.2	15176	20.2	16293	14.8	17223	9.8
14317	14.4	15203	15.2	16309	14.4	17289	11.0
14335	17.8	15242	11.6	16328	15.0	17291	13.6
14341	14.0	15262	10.8	16393	11.2	17294	13.2
14371	11.6	15336	12.8	16533	10.2	17412	10.4
14375	9.8	15362	10.2	16539	14.2	17421	13.8
14444	9.4	15605	12.0	16574	7.4	17437	14.8
14552	10.0	15679	12.4	16724	9.6	17447	14.4
14567	8.8	15778	14.8	16908	13.6	17469	14.8
14647	14.8	15797	6.0	16923	11.0	17640	7.4
14683	13.6	15799	14.0	16927	13.6	17642	14.4
14689	14.0	15889	15.8	16934	13.0	17649	11.0
14707	13.8	15900	12.6	16945	10.6	17653	7.8
14796	12.2	15917	13.8	17002	10.2	17733	16.4
14958	14.8	15960	20.2	17068	10.2	17757	10.4
14995	13.2	15975	8.8	17073	18.0	17772	10.6
15025	10.8	16064	12.6	17111	12.0	17795	11.4
15104	12.8	16287	8.4	17118	11.4	17845	12.8
15112	11.0	16289	9.8	17201	11.0		

APPENDIX TABLE 28.--Tag numbers (O-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 24 and 25 October 1962--Continued

Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight
			Reef - males				
	Kg.		Kg.		Kg.		Kg.
18096	8.4	23153	10.2	23848	9.8	24830	10.2
18508	7.8	23165	7.2	23853	13.8	24848	12.2
18543	12.4	23167	11.8	23856	11.4	24990	11.2
18546	8.8	23210	10.2	23910	15.6	25404	11.6
18572	10.6	23212	8.4	23938	13.0	25950	15.0
18581	11.2	23282	10.2	23941	12.4	26563	12.8
18583	11.4	23291	10.0	23981	11.2	26589	9.8
18597	12.2	23330	18.4	23988	12.2	26590	14.8
18608	9.6	23344	10.0	24065	14.4	26659	10.2
18611	11.6	23359	17.0	24071	11.2	26862	13.2
18631	9.8	23374	10.6	24117	10.0	26866	15.6
18645	13.0	23391	11.8	24128	15.4	26885	11.8
18783	9.8	23391	13.0	24168	8.2	26902	8.8
19806	10.0	23400	11.4	24184	10.4	27044	15.4
19932	10.6	23813	14.0	24186	16.8	27049	13.8
20024	6.4	23827	10.2	24198	9.6	27067	8.6
20695	9.6	23830	11.8	24473	6.6	27091	14.4
22687	14.6	23837	16.6	24493	10.4	27099	11.8
23140	10.6	23841	10.2	24724	11.8		
			Reef - females				
18031	10.4	23233	9.2	23991	10.8	25496	8.4
18172	12.4	23287	9.8	24008	13.4	25910	8.2
18501	11.2	23294	8.2	24040	10.8	26614	8.2
18530	7.8	23322	17.2	24063	8.8	26692	7.8
18569	10.6	23388	9.8	24069	9.8	26811	9.0
18607	11.6	23424	7.8	24074	7.8	26817	12.8
18700	8.4	23810	9.6	24126	10.4	26827	8.2
18787	10.6	23812	13.8	24154	9.0	26834	11.4
18808	9.2	23835	11.0	24158	10.0	26837	11.2
19903	9.4	23847	16.2	24259	9.8	26864	13.4
19978	12.2	23863	12.6	24292	10.8	26878	10.4
19997	9.4	23866	8.2	24317	12.2	26880	9.8
20431	14.0	23876	9.8	24409	12.0	26953	9.6
20151	7.0	23894	7.6	24577	11.0	27040	10.6
20760	11.8	23916	10.2	24658	11.4	27041	12.8
22248	9.2	23933	15.0	24680	11.6	27071	11.4
23162	8.2	23954	15.0	24827	11.8		
23177	11.6	23985	14.6	24863	13.6		
23215	8.0	23986	11.8	24889	11.2		

APPENDIX TABLE 28.--Tag numbers (0-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 24 and 25 October 1962--Continued

Tag number	Weight	Tag number	Weight	Tag number	Weight	Tag number	Weight
			Northeast Point - males				
	Kg.		*Kg.*		*Kg.*		*Kg.*
33361	11.0	38218	12.6	39250	13.4	40720	18.2
33369	14.2	38225	13.0	39274	12.8	40803	15.4
33370	16.8	38293	18.8	39284	10.6	40807	14.4
33610	7.8	38316	15.0	39355	9.6	40910	9.8
33757	14.0	38349	15.8	39494	11.8	40964	13.2
33787	10.2	38387	15.4	39510	12.0	41013	9.0
33846	12.0	38445	21.6	39526	12.2	41032	23.6
33872	15.8	38474	15.2	39570	16.0	41107	10.2
34369	18.8	38986	15.2	39573	12.8	41143	15.0
34374	15.0	39000	16.4	39597	15.0	41150	10.6
35026	11.6	39007	14.2	39607	11.8	41194	18.2
35253	13.6	39025	15.6	39637	11.6	41242	11.6
35271	10.8	39039	12.4	39642	11.4	42009	10.6
35291	11.6	39047	13.8	39699	13.4	42307	14.0
38062	13.3	39059	12.4	40604	19.0	42424	15.8
38065	10.6	39135	16.4	40612	13.4	42439	10.4
38094	12.2	39163	9.4	40664	10.6	42447	19.8
38151	14.6	39205	18.6	40695	19.8	42490	15.6
38198	17.0	39211	10.0	40704	20.6		
			Northeast Point - females				
33364	9.6	38120	10.2	39209	14.0	40955	11.8
33365	12.6	38127	14.6	39236	10.0	40959	11.4
33513	13.8	38152	12.4	39282	12.2	40984	12.8
33626	13.0	38238	8.0	39411	11.6	41017	12.0
33640	17.6	38272	13.6	39491	14.6	41031	9.8
33654	14.2	38273	12.4	39505	10.0	41115	15.4
33681	12.8	38322	17.0	39522	18.0	41119	10.6
33798	12.2	38324	10.0	39555	10.4	41156	11.2
33821	9.2	38331	13.6	39558	14.2	41217	10.0
33858	12.2	38343	13.4	39601	10.8	41290	8.4
34311	10.2	38365	13.3	39611	7.0	42324	13.6
34325	11.0	38368	15.2	40137	8.8	42410	12.8
35256	14.0	38421	11.2	40648	9.6	42414	11.0
37326	13.0	38488	11.2	40662	9.0	42460	10.0
38018	12.6	38489	15.8	40675	10.6	42474	16.6
38020	14.8	38499	12.8	40846	15.6	43331	10.2
38045	12.4	39007	10.6	40880	16.8	44338	12.2
38084	13.6	39070	7.8	40909	13.2	48889	11.2
38105	10.8	39071	13.4	40929	22.2		

APPENDIX TABLE 29.--Record of fur seal pups tagged, Pribilof Islands, Alaska, 1941, 1945, 1947-49, and 1951-62

Year	Series	St. Paul Island	St. George Island	Location of tag	Checkmarks
1941	USA 1-10000;	10000		Front flipper	Branded, nape of neck
	USA 1-1000 and	1000		♂♂ right front and	Double tagged, branded
	USA 5001-6000	1000		hind flippers; ♀♀ left front and hind flippers	nape of neck
1945	10001-11000 (no letter prefix)	973		Left front flipper	None
1947	A 1-20000	19183		Left front flipper	1/4" hole between 1st and 2nd digits left hind flipper
1948	B 1-19673	19532		Left front flipper	None
1949	CS 1-20000	19963		Left hind flipper	None
1951	D 1-1000	1000		Right hind flipper	1/2 left ear on 100 tagged pups removed
1952	E 1-20000	19979		Right front flipper	Tip of 1st digit on right hind flipper sliced off
1953	F 1-10000	9990		Left front flipper	Tip of left front flipper sliced off
	G 7001-7400	398		" " "	" " " "
1954	G 1-7000	7000		Right front flipper	"V" notch near tip right front flipper
	G 7401-10400	3000		" " "	" " " " "
1955	H 1-10000			Left front flipper	Tip of 1st digit on left hind
	10001-5000 (no letter prefix)	49870		" " "	flipper sliced off
1956	I 1-10000		9894	Right front flipper	Tip of right front flipper sliced off
	I 10001-50000	39900		" " "	" " " " "
1957	J 1-10000		9972	Left front flipper	"V" notch near tip left front flipper
	J 10001-50000	39870		" " "	" " " " " "
1958	K 1-10000		9994	Right front flipper	"V" notch near tip right front flipper
	K 10001-50000	39923		" " "	" " " " "
	K 10001-15000	5000		Right and left front flippers	Double tagging plus check-mark
1959	L 1-10000		9980	Left front flipper	Tip of left front flipper sliced off
	L 10001-50000	39901		" " "	" " " " "
1960	M 1-12000		11992	Right front flipper	Tip of right front flipper sliced off
	M 12001-60000	47989		" " "	" " " " "
1961	N 1-10000		9988	Left front flipper	"V" notch near tip left front flipper
	N 10001-50000	39933		" " "	" " " " " "
1962	O 1-10000		9980	Right front flipper	"V" notch near tip right front flipper
	O 10001-50000	39928		" " "	" " " " " "

APPENDIX TABLE 30.--Bull counts, Pribilof Islands, Alaska, 1911-41 and 1943-62

Year	St. Paul Island		St. George Island		Both islands	
	harem	idle	harem	idle	harem	idle
1911	1,090	258	266	71	1,356	329
1912	1,077	93	281	20	1,358	113
1913	1,142	77	261	28	1,403	105
1914	1,316	159	243	13	1,559	172
1915	1,789	546	362	127	2,151	673
1916	2,948	2,278	552	354	3,500	2,632
1917	4,166	2,341	684	365	4,850	2,706
1918	4,610	2,245	734	199	5,344	2,444
1919	4,573	2,158	585	81	5,158	2,239
1920	3,542	1,078	524	83	4,066	1,161
1921	3,443	711	466	36	3,909	747
1922	3,184	493	378	15	3,562	508
1923	3,051	303	361	9	3,412	312
1924	3,127	375	389	15	3,516	390
1925	3,103	283	423	28	3,526	311
1926	3,478	368	556	55	4,034	423
1927	3,916	846	727	126	4,643	972
1928	5,059	1,208	991	241	6,050	1,449
1929	5,998	1,339	1,189	294	7,187	1,633
1930	6,823	1,555	1,489	344	8,312	1,899
1931	7,557	1,519	1,676	369	9,233	1,888
1932	8,268	1,940	1,820	409	10,088	2,349
1933	8,334	1,933	1,879	408	10,213	2,341
1934	8,841	1,860	1,929	422	10,770	2,282
1935	9,444	2,082	2,103	453	11,547	2,535
1936	10,055	2,253	-	-	-	-
1937	10,689	2,516	2,411	515	13,100	3,031
1938	10,720	1,787	-	-	-	-
1939	9,122	2,616	1,858	357	10,980	2,973
1940	9,662	3,968	1,988	571	11,650	4,539
1941	10,089	5,059	1,942	396	12,031	5,455
1943	10,948	3,523	2,107	330	13,055	3,853
1944	11,080	2,539	2,294	450	13,374	2,989
1945	10,750	4,055	2,434	750	13,184	4,805
1946	10,566	3,605	2,430	611	12,996	4,216
1947	10,160	3,331	1,808	479	11,968	3,810
1948	10,386	3,400	1,814	563	12,200	3,963
1949	9,554	2,976	1,746	552	11,300	3,528
1950	9,442	3,152	1,959	574	11,401	3,726
1951	9,434	3,581	1,825	549	11,259	4,130
1952	9,318	4,717	1,983	605	11,301	5,322
1953	9,848	5,912	2,285	826	12,133	6,738
1954	9,906	6,847	2,228	1,311	12,134	8,158
1955	9,034	8,650	2,130	1,902	11,164	10,552
1956	9,384	9,016	-	-	-	-
1957	9,562	10,060	2,423	2,693	11,985	12,753
1958	9,970	9,510	2,619	3,030	12,589	12,540
1959	10,003	11,485	2,527	2,699	12,530	14,184
1960	10,247	10,407	2,552	2,630	12,799	13,037
1961	11,163	11,791	2,842	2,489	14,006	14,280
1962	10,332	9,109	2,342	2,650	12,674	11,759

APPENDIX TABLE 31.--Dead-pup counts, by rookery, Pribilof Islands, Alaska, 1941 and 1948-62

Rookery	1941	1948[1]	1949[1]	1950	1951	1952[1]	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
St. Paul Island																
Morjovi	933	20600	2600	3000	3592		3764	8049	5571	10278	4253	2290	4560	6825	5259	4881
Vostochni	7708		12966	13120	18450		19503	25233	14473	20498	12732	7247	7105	11333	10173	8565
Little Polovina	292		1600	1740	2208		2211	3852	2782	4443	1695	975	1597	2427	2415	2121
Polovina Cliffs	2356			3800	5580	2954	5451	6413	5964	8637	4425	1826	2586	3462	4576	2957
Polovina			1779	5660	6402	3200	5036	6459	4660	7463	5432	2184	3311	5268	2499	1880
Ardiguen	42			170	242		189	282	387	364	249	102	141	331	411	225
Gorbatch	896			2810	3559		3679	4900	4789	6291	3801	1655	2100	3168	3550	1373
Reef	2269			9520	11007		13661	12959	15145	14399	11301	5550	6052	9664	10047	7897
Kitovi	404		800	1160	1517		1695	1669	2610	2892	1588	608	882	2006	2215	2081
Lukanin			635	770	712		1086	1129	1129	1718	870	324	631	1037	1294	660
Tolstoi	1623			4230	6033		6154	7552	6489	6789	5659	2823	3691	5237	4761	3004
Little Zapadni	372			2120	2804		2446	4979	3555	4611	2325	1312	1691	4148	3047	2399
Zapadni Reef	171		575	660	353		1116	2278	1383	1674	917	246	608	1472	1291	598
Zapadni	1284			4660	8204		12221	10424	6607	8650	6415	4045	5009	6450	6329	6627
Counted total	18350			53420	70663		78212	96178	75544	98707	61662	31187	39964	62828	57867	45268
Estimated oversight 5%	918			2671	3533		3911	4809	3777	4935	3083	1559	1998	2946	2893	2263
Total	19268			56091	74196		82123	100987	79321	103642	64745	32746	41962	65774	60760	47531
St. George Island																
North							3197	3776		6357	3942	1626	2653	3489	3883	2242
East							846	1524		2203	1064	118	664	1112	1347	504
Staraya Artil							3353	2903		3806	2729	1552	1987	2000	2514	1435
Zapadni							1272	1453		2742	1569	844	1633	1902	2019	1740
Counted total							8668	9656		15108	9304	4756	6937	8503	9763	5921
Estimated oversight 5%							433	483		755	465	238	347	425	488	296
Total							9101	10139		15863	9769	4994	7284	8928	10251	6217

[1] Partial counts

No counts made in years 1942 through 1947.

MS #1279

GPO 841-662

Created in 1849, the U.S. Department of the Interior is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

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